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THE DISTRIBUTION AND BIOLOGY OF SPHAEROCERIDAE (DIPTERA) IN UPLAND REGIONS OF NORTHERN ENGLAND

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Abstract

1. Over 1600 adults of 37 species of Sphaeroceridae, including one species new to Britain and one new to science, were caught in pitfall traps at 49 sites in uplands or on peatlands in northern England during 1977 and 1978. This increases the total number of Sphaeroceridae recorded from uplands in Britain to 47 species, although none of these are restricted to this habitat.
2. Comparison has been made between the species found on eight paired peat and mineral soil sites. *Crumomyia nitida* was significantly more abundant in traps on peat sites. *Lotophila atra*, *Spelobia clunipes* and *S. rufilabris* were significantly more abundant in traps on mineral sites.
3. The distribution of Sphaeroceridae according to major invertebrate communities is discussed. The trap catches on lowland mires were notable for the dominance of *Minilimosina vitripennis* and the greater proportional representation of *Copromyza stercoraria* as well as the absence of *Copromyza similis* and *Crumomyia nitida*. There were no significant differences between the northern heath communities and blanket bog communities, although there was a significant difference between the proportions of *Crumomyia nitida* and *Lotophila atra* on *Juncus squarrosus* on the one hand and blanket bog and heath on the other.
4. *Crumomyia nitida* showed a marked bimodal pattern of captures in both 1977 and 1978. *Lotophila atra*, in contrast, failed to show a similar bimodality. There was a marked difference in both numbers and proportions of the common species caught between years.

Introduction

Relatively little is known of the distribution of insects in upland regions of Great Britain despite the fact that over a quarter of the country lies above 250m. The Tipulidae (Diptera) of the Moor House Nature Reserve, Cumbria, have been studied by Coulson (1959), whilst Nelson (1971) has published an account of the insects, mainly Diptera, of sites on the same Reserve, working between 548–579m. More recently, Randall *et al.* (1981), Disney *et al.* (1981) and Coulson and Butterfield (1982) have studied the upland Sepsidae, Phoridae and Lonchopteridae (Diptera) respectively. These last three accounts were based on material collected during a survey of 42 peat and upland sites in northern England. The present study on the Sphaeroceridae used adult material from the same collections and additional material collected at seven more sites in 1978.

Sphaeroceridae, or lesser dung flies, are a family of small acalyptrate Diptera. They feed and breed in decaying organic matter, including dung, carrion, fungi, seaweed and rotting vegetation, and may be readily caught in pitfall traps. Many species show a marked preference for one particular type of decaying organic matter, whilst others appear to be general scavengers (cf. Pitkin, in press).

Nelson (1971) lists 31 species of Sphaeroceridae from Moor House, although one of these, *Minilimosina exigua* (Rondani), is now regarded as a synonym of *M. fungicola* (Haliday). Only 14 of these were represented by more than a single individual per site. Previously, only one species, *Lotophila atra* (Meigen), is mentioned specifically by Richards (1930) as occurring in uplands, viz in Brecon up to 2,000ft (613m) and on the summit of Skiddaw, Cumbria at 3,045 ft (932m).

The present study adds appreciably to knowledge of the Sphaeroceridae in upland Britain and involves over 1600 specimens of 37 species, including *Minilimosina gemella*

Rohacek, new to Britain and a further species of *Minilimosina* new to science (Pitkin, in press).

Methods

Two of us (JCC and JB) selected 42 typical peatland and upland grassland sites distributed across the north of England, in Yorkshire, Cumbria and Co. Durham. Eight of the grassland sites were in close proximity to a peatland site and selected to enable comparison to be made of the faunas on the two soil types. The peat sites ranged from deep blanket peat to relatively dry northern heath, where the peat layer is less than 100mm deep. Lowland oligotrophic mires were included to extend the altitude range of the peat sites, but no low altitude mineral sites were investigated. The sites ranged between 11m at Meathop Moss to 823m at Dun Fell 2700 (Table 1 & Fig. 1). An additional seven sites were investigated in 1978 only and these included the summit of Great Dun Fell at 847m.

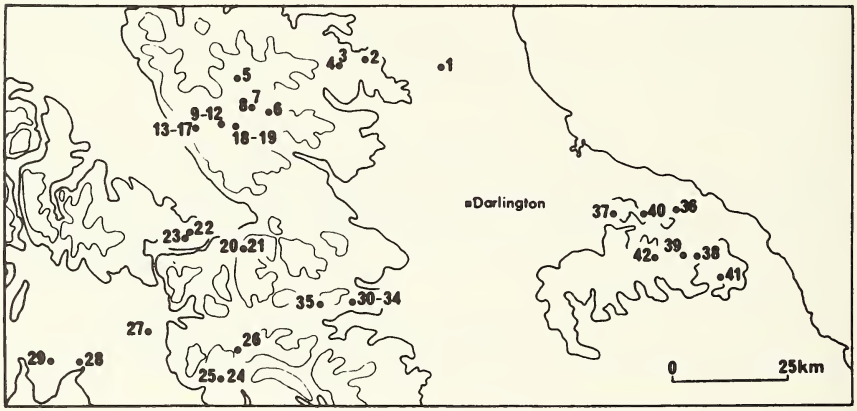

FIGURE 1
Map of the north of England showing the position of the study sites (Thick contour lines at 244m and thin lines at 488m)

Ten pitfall traps were used at each of the sites except at Rowantree Scar, where five traps were used at each of two sites. Each trap had a mouth diameter of 45mm. The traps were emptied at approximately monthly intervals during April, May, September and October and at fortnightly intervals during June, July and August. Each trap was filled to a depth of some 20mm with a water/detergent mixture, to which a small amount of formalin had been added to aid preservation of the catch. The Sphaeroceridae were separated from the catch and sent to BRP for identification.

Results

A total of 1,662 specimens were caught in the traps at the 49 sites during the study. A total of 37 species were found (Table 2). Twelve of the 37 species were represented by single specimens and only seven species were represented by over 24 specimens. The most numerous species were *Lotophila atra* (Meigen) (22% of the total catch), *Crumomyia nitida* (Meigen) (22%), *Spelobia clunipes* (Meigen) (19%), *S. rufilabris* (Stenhammer) (11%) and *Minilimosina vitripennis* (Zetterstedt) (10%).

Comparison between Upland Peat and Mineral Soils

The eight pairs of sites were used to obtain a comparison between the Sphaeroceridae on peat and neighbouring mineral soils. The captures at individual sites were too small for

TABLE 1

List of sites used in the survey in 1977–1978

Site	Grid ref.	Altitude (metres)	Dominant vegetation
1. Bear Park	NZ 252442	91	Grasses
2. North Plantation	NZ 083455	274	Calluna
3. Waskerley A	NZ 016447	411	Calluna
4. Waskerley B	NZ 014446	411	Calluna/Eriophorum
5. Kilhope	NY 800432	627	Eriophorum
6. Langdon Common	NY 863349	625	Eriophorum
7. Grass Common A	NY 827357	674	Grasses
8. Grass Common B	NY 825357	674	Calluna/Eriophorum
9. Moor House A	NY 755332	533	Grasses
10. Moor House B	NY 756328	561	Grasses
11. Moor House C	NY 764332	549	Juncus squarrosus
12. Moor House D	NY 765333	551	Calluna/Eriophorum
13. Dun Fell 1400	NY 697295	427	Juncus squarrosus
14. Dun Fell 1700	NY 702298	518	Juncus squarrosus
15. Dun Fell 1900	NY 708302	579	Juncus squarrosus
16. Dun Fell 2050	NY 713307	625	Grasses
17. Dun Fell 2700	NY 711319	823	Eriophorum
18. Cow Green A	NY 814302	500	Calluna/Eriophorum
19. Cow Green B	NY 814303	500	Grasses
20. Tailbridge A	NY 810042	518	Grasses
21. Tailbridge B	NY 811043	518	Eriophorum
22. Sunbiggin A	NY 687090	335	Grasses
23. Sunbiggin B	NY 680083	274	Calluna
24. Scar Close A	SD 755779	336	Calluna/Eriophorum
25. Scar Close B	SD 754780	336	Grasses
26. Newby Head	SD 795836	427	Juncus squarrosus
27. Burns Beck	SD 595880	168	Calluna/Eriophorum
28. Meathop Moss	SD 445818	11	Calluna
29. Deer Dyke	SD 343823	15	Calluna
30. Golden Groves	SE 044945	457	Calluna
31. Apedale A	SE 022943	388	Grasses
32. Apedale B	SE 023944	396	Calluna
33. Rowantree Scar A	SE 032932	411	Juncus squarrosus
34. Rowantree Scar B	SE 032932	411	Calluna
35. Beldon Bottom	SD 967940	488	Calluna/Eriophorum
36. Tranmire	NZ 762117	213	Calluna
37. Kildale	NZ 620111	274	Calluna
38. Murk Mire	NZ 797025	240	Calluna
39. Yarsley	NZ 750007	305	Calluna
40. Job Cross	NZ 692110	259	Calluna
41. Fen Bog	SE 852974	198	Calluna/Eriophorum
42. Botton Cross	NZ 701017	427	Eriophorum
Additional sites used in the survey in 1978			
43. Grass Common B X	NY 825358	674	Calluna/Eriophorum
44. Moor House D X	NY 765332	551	Calluna/Eriophorum
45. Tailbridge A X	NY 810043	518	Grasses
46. Tailbridge B X	NY 811042	518	Eriophorum
47. Great Dun Fell	NY 712322	847	Grasses
48. Great Dun Fell	NY 708328	780	Eriophorum
49. Little Dun Fell	NY 705330	842	Grasses

Eriophorum is in all cases *Eriophorum vaginatum*.

TABLE 2

Species of Sphaeroceridae caught in pitfall traps in upland regions of northern England during 1977–1978

Copromyzinae

Copromyza equina Fallen. 11 specimens (0.66% of total catch). Sites 5, 8, 15, 19–20, 24, 31. Altitude 336–674m.

C. similis (Collin). 59 specimens (3.55%). Sites 1, 4–5, 10–11, 13–14, 16–17, 19, 23, 26, 31, 33, 38, 45, 48, 49. Altitude 91–842m.

C. stercoraria (Meigen). 64 specimens (3.85%). Sites 1, 6, 9–11, 16–20, 24, 31, 38, 40–42. Altitude 91–823m.

Crumomyia nigra (Meigen). 6 specimens (0.36%). Sites 20,49. Altitude 518–842m.

C. nitida (Meigen). 363 specimens (21.84%). Sites 1–5, 10–21, 23–44. Altitude 91–823m.

C. notabilis (Collin). 6 specimens (0.36%). Sites 1–4, 10, 49. Altitude 91–842m.

Lotophila atra (Meigen). 364 specimens (21.90%). Sites 1–11, 13–19, 21–27, 30–34, 36, 38–45, 48–49. Altitude 91–842m.

Sphaerocerinae

Ischiolepta pusilla Fallen. 12 specimens (0.72%). Sites 5, 7, 16, 19–20. Altitude 336–674m.

Sphaerocera curvipes Fallen. 6 specimens (0.36%). Sites 5, 8, 16, 19–20. Altitude 500–674m.

Limosininae

Chaetopodella scutellaris (Haliday). 3 specimens (0.18%). Sites 1, 16. Altitude 91–625m.

Coproica ferruginata (Stenhammer). 1 specimen (0.06%). Site 15. Altitude 579m.

C. vagans (Haliday). 5 specimens (0.30%). Sites 4–5, 16, 40. Altitude 259–627m.

Halidayina spinipennis (Haliday). 1 specimen (0.06%). Site 16. Altitude 625m.

Herniosina bequaerti (Villeneuve). 1 specimen (0.06%). Site 10. Altitude 561m.

Kimosina longisetosa (Dahl). 4 specimens (0.24%). Sites 27, 49. Altitude 168–842m.

K. plumosula (Rondani). 1 specimen (0.06%). Site 37. Altitude 274m.

Leptocera coxata (Stenhammer). 10 specimens (0.60%). Sites 1, 16, 28, 41. Altitude 11–625m.

L. cryptochaeta (Duda). 1 specimen (0.06%). Site 16. Altitude 625m.

L. fenestralis (Fallen). 5 specimens (0.30%). Sites 25, 27, 38, 41. Altitude 168–336m.

L. fontinalis (Fallen). 16 specimens (0.96%). Sites 4, 16, 18, 30, 36, 38. Altitude 213–625m.

L. lutosa (Stenhammer). 3 specimens (0.18%). Sites 1, 19. Altitude 91–500m.

Minilimosina fungicola (Haliday). 1 specimen (0.06%). Site 1. Altitude 625m.

M. gemella Rohacek. 20 specimens (1.20%). Sites 1, 10–11, 13, 15–16, 18, 24, 25, 31, 34–35. Altitude 91–625m.

M. v-atrum (Villeneuve). 1 specimen (0.06%). Site 16. Altitude 625m.

M. vitripennis (Zetterstedt). 159 specimens (9.56%). Sites 1, 4–5, 9–10, 12–13, 15–18, 23–28, 30–32, 37–38, 43–44, 48–49. Altitude 11–847m.

M. sp. nov. 18 specimens (1.08%). Sites 1, 5, 7, 10, 17, 19, 23–30, 36, 44, 48. Altitude 11–823m.

Opalimosina liliputana (Rondani). 1 specimen (0.06%). Site 11 or 12. Altitude 549–554m.

Pullimosina heteroneura (Haliday). 1 specimen (0.06%). Site 17. Altitude 823m.

Spelobia bifrons (Stenhammer). 1 specimen (0.06%). Site 16. Altitude 625m.

S. clunipes (Meigen). 312 specimens (18.66%). Sites 1–5, 7, 9, 11, 15–19, 22–27, 30–31, 33, 35–36, 38–39, 49. Altitude 91–847m.

S. luteilabris (Rondani). 9 specimens (0.54%). Site 33. Altitude 411m.

S. nana (Rondani). 21 specimens (1.26%). Sites 1, 9–10, 13, 22–23, 25–27, 31, 33. Altitude 91–561m.

S. rufilabris (Stenhammer). 178 specimens (10.70%). Sites 1, 4–5, 7, 10–12, 14–17, 19, 23, 25–26, 29–33, 35, 38, 43–44, 48–49. Altitude 15–842m.

S. talparum (Richards). 5 specimens (0.30%). Sites 13, 18–19, 25. Altitude 336–500m.

Telomerina pseudoleucoptera (Duda). 1 specimen (0.06%). Site 14. Altitude 518m.

Xenolimosina setaria (Villeneuve). 1 specimen (0.06%). Site 13. Altitude 427m.

detailed analysis and the captures at the eight peat soil sites have been pooled for both 1977 and 1978, as were those at the eight mineral soil sites. Six species occurred in sufficient numbers to allow statistical comparisons and these are shown in Table 3. *Crumomyia nitida* formed almost a third of the individuals taken on the peat sites but only one twentieth of those on the mineral soils. No species, apart from those represented by only one or two specimens, was restricted to either peat or mineral soils. Overall, slightly more than twice the number of specimens were taken in traps on the mineral soils as compared to the peat sites. This suggests that there might be more food resources on mineral soils. The grasslands were heavily grazed by sheep, and White (1960a) comments that six times more dung is deposited per unit area on these upland grasslands than on neighbouring peat areas, despite the fact that sheep have a free range. If this is the case, then it would appear that proportionally more Sphaeroceridae per unit dung production were caught on the peat soils than on the grasslands. It should, however, be remembered that not all of the species caught in the traps feed and breed in sheep dung.

TABLE 3

The distribution of the more abundant Sphaeroceridae on paired peat and grassland sites in 1977–1978

Species	Peat Sites		Mineral Sites			
	N	%	N	%	χ^2	p
L. atra	53	24.1	107	26.9	18.22	<0.05
C. nitida	68	31.0	21	5.3	24.82	<0.05
C. stercoraria	9	4.1	14	3.5	1.08	n.s.
S. clunipes	28	12.7	93	23.4	34.92	<0.05
S. rufilabris	20	9.1	79	19.8	35.16	<0.05
M. vitripennis	21	9.5	32	8.0	2.28	n.s.
Other 17 species	21	9.5	52	13.1	–	–
Total specimens	220	–	398	–	–	–

Chi-square has been calculated on the Null hypothesis that the number of the specimens caught during the two year study is the same on the combined peat and mineral sites.

The Distribution of Sphaeroceridae according to Major Invertebrate Communities

From an analysis of the major invertebrate groups (spiders, Hemiptera (Homoptera), Coleoptera (Staphylinidae and Carabidae), Diptera (Tipulidae, Empididae, Dolichopodidae, Bibionidae, Mycetophilidae, but excluding the Sphaeroceridae) the main 42 sites have been grouped by an appropriate clustering technique (Coulson & Butterfield, in press). Thirty-seven of the sites clustered into five groups and five sites remained unclustered. The five groups represent lowland mires, blanket bog (divided into three sub groups), northern heaths, *Juncus squarrosus* dominated areas, and grasslands on mineral soils. The captures of Sphaeroceridae from the sites forming these groups are presented in Table 4. The dominance of *Minilimosina vitripennis* on the lowland mires singles these out from all others. This group of sites is also notable for the greater proportional representation of *Copromyza stercoraria* and the absence of *C. similis* and *Crumomyia nitida*. No significant differences existed between the sub divisions of group II, the blanket bog community, and these have been combined. *Crumomyia nitida* is the dominant species, with *Lotophila atra* the next most abundant species, followed closely by *Spelobia clunipes*. The northern heaths (community III) showed a very similar distribution of species to those on the blanket bog sites and there are no significant differences.

Considering the two common species, *Crumomyia nitida* and *Lotophila atra*, the proportions differ significantly between the *Juncus squarrosus* sites, on the one hand, and the blanket bog ($\chi^2 = 51.9$, $p < 0.001$) and the heath ($\chi^2 = 12.3$, $p < 0.001$), on the other, with *L. atra* becoming more numerous (but not significantly so) on the *Juncus* areas. The dominance of *L. atra* was even more apparent on the mineral grasslands, where it was over four times more abundant than *C. nitida*. The proportional abundance of *C. nitida* increased with altitude in the peat communities II and III, but altitude is not the only factor influencing the abundance of *C. nitida*, as can be seen from the decrease in numbers on the high altitude grassland sites. Although sheep stocking was high on the heaths, these areas gave the lowest captures of Sphaeroceridae per site (or per trap).

TABLE 4
The species distribution of Sphaeroceridae according to invertebrate community

Species	Community				
	Lowland mire	Blanket bog	Heaths	Juncus	Grassland
	I	II	III	IV	V
C. nitida	0%	53%	49%	30%	8%
L. atra	5%	14%	25%	39%	38%
C. similis	0%	1%	2%	9%	11%
C. stercoraria	19%	6%	1%	2%	4%
M. vitripennis	63%*	7%	7%	9%	1%
S. clunipes	4%	11%	6%	9%	17%
Total individuals	79	346	144	193	156
Total species	10	18	15	15	20
Number of sites	3	14	9	6	5
Specimens per site	26.3	24.7	16.0	32.2	31.2

* This value is partially due to a large catch of *M. vitripennis* at one site, Burns Beck, but it was also dominant at one of the other two lowland sites.

Seasonal Distribution

It was not possible to visit all of the sites on the same date, and in order to examine the seasonal distribution of the dominant species, the mean numbers captured per day were determined between each change of traps and these were aggregated to give a composite picture for all the 42 sites sampled in both 1977 and 1978.

None of the species showed a marked altitudinal variation in the time of capture over the range studied. In both 1977 and 1978 a marked bimodal pattern of captures of *Crumomyia nitida* occurred, with a peak in numbers in late June or early July, a trough in August and a second peak in September and October (Fig. 2). However the pattern in 1978 was different from that in 1977 in that no specimens were taken in May or June in 1978. The size of the delayed spring emergence was only 29% of the annual catch, whereas in 1977 it formed 56% of the captures. This bimodal pattern is similar to that found for *Scathophaga stercoraria* L. (Diptera: Scatophagidae) at Moor House (Coulson, unpublished) and elsewhere, but in the case of this species, this bimodality is not an indication of two generations per year but rather a response to the environmental conditions in mid summer. Accordingly caution should be exercised in interpreting the bimodal pattern of captures of *C. nitida* as indicating that it is bivoltine on uplands. In contrast to this pattern

in *C. nitida*, *Lotophila atra* failed to show a similar bimodality of emergence during the year (Fig. 3). In 1977, the peak of captures was in late August, whilst in 1978 it occurred in late July and early August, with a suggestion of a secondary peak in September. *Spelobia clunipes* was much more abundant in 1978 than in 1977 and only data for the former year have been presented (Fig. 4). There is an indication of a peak of numbers in early July and more pronounced peaks in early August and October.

In other years, we have kept pitfall traps in position throughout the winter at some of these upland sites. After mid November, few, if any, insects are captured until early May. This is in contrast to the situation in lowlands where certain adult Sphaeroceridae are

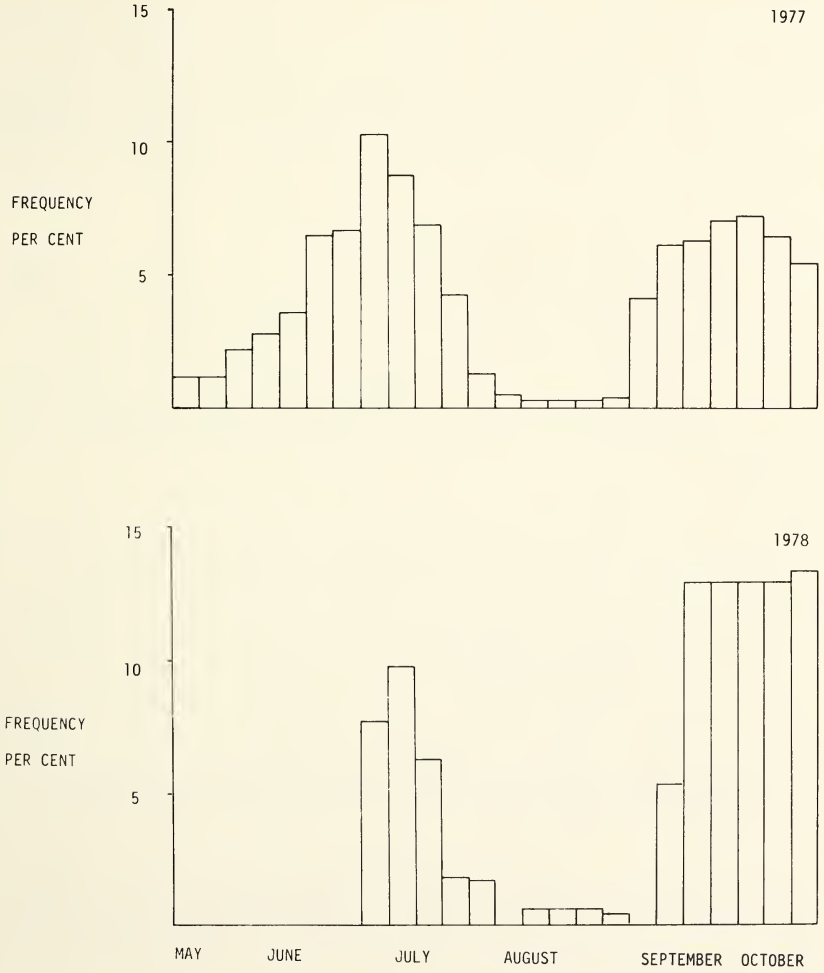

FIGURE 2
The phenology of *Crumomyia nitida* (Meigen). Frequency histograms of weekly catch (based on average catch per day) for the 42 sites studied in both 1977 and 1978

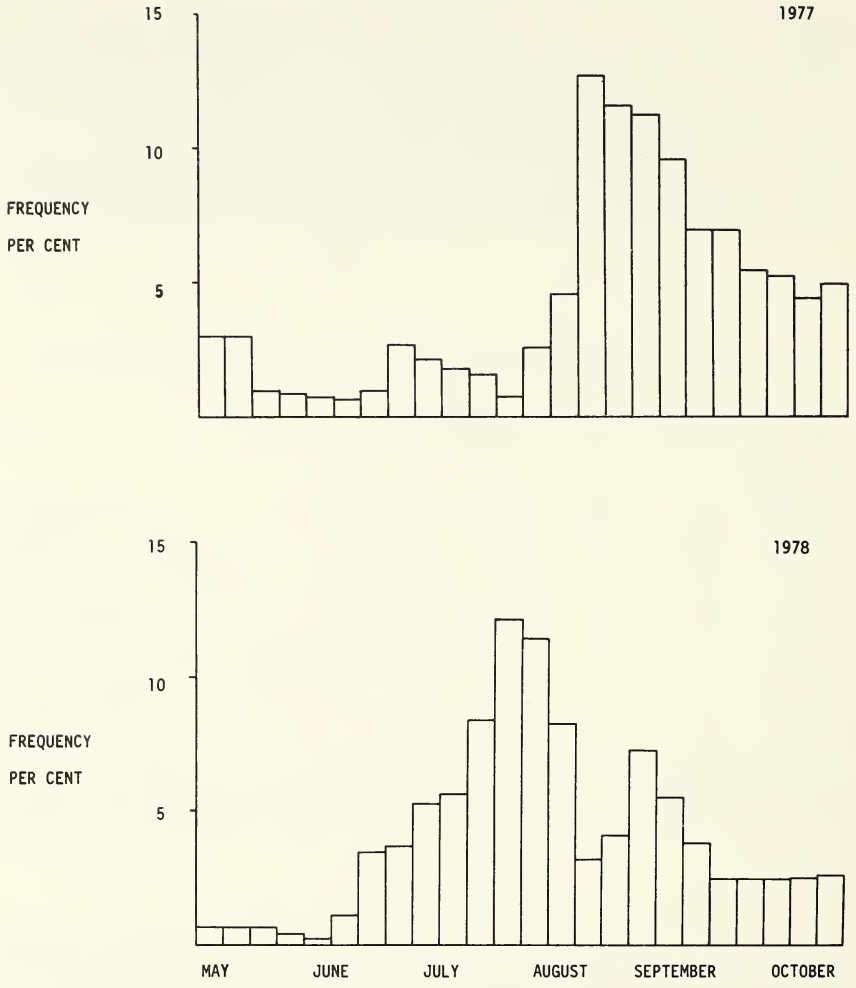

FIGURE 3
The phenology of *Lotophila atra* (Meigen). Frequency histograms of weekly catch (based on average catch per day) for the 42 sites studied in both 1977 and 1978

active during the winter months i.e. *Copromyza similis* (Pitkin, in press). This difference is undoubtedly caused by much lower temperatures in upland areas, where most winters the soil is frozen continuously for many weeks or even months. Accordingly the period of activity for adult Sphaeroceridae is reduced by 2 to 3 months in upland regions as compared with lowland areas.

Variation in Species Composition between Years
There were marked differences in the numbers and proportions of each of the common

species captured in 1977 and 1978. *Crumomyia nitida* formed 50.2% of the captures at the sites in 1977 but only 12.2% in 1978 and the difference in timing has already been referred to. An even more marked difference occurred with *Spelobia clunipes* which was much more numerous in 1978. The cause for these differences may lie in the extremely dry summer of 1976, which may have influenced the species composition in 1977.

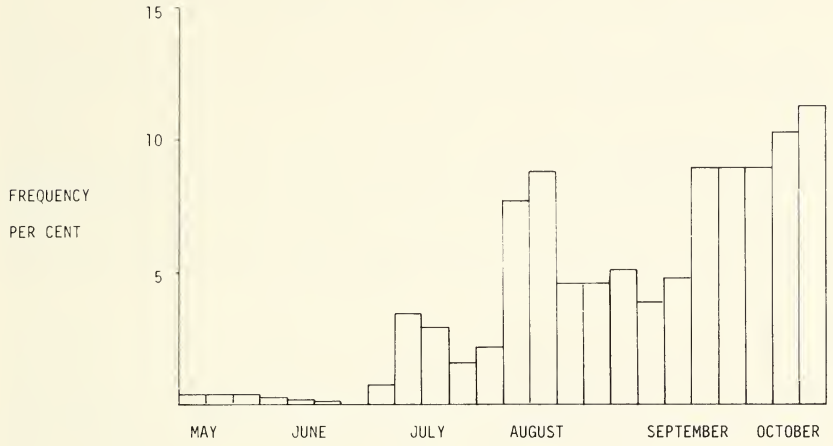

FIGURE 4
The phenology of *Spelobia clunipes* (Meigen). Frequency histogram of weekly catch (based on average catch per day for the 42 sites studied in 1978

Discussion

Of the 113 species of Sphaeroceridae recorded from Britain (Pitkin, in press), 37 were found during this study and all but one of these, *Minilimosina fungicola*, were found above 250m. When these records are combined with those of Nelson (1971) from Moor House (*c* 550m), 47 species have been recorded from uplands, although all but seven are represented by less than 25 specimens. These figures suggest that the upland sphaerocerid fauna is relatively impoverished compared with lowland Britain. Only two of the species have not previously been recorded from lowland areas of Britain and these species, *Minilimosina gemella* and *M.* sp.nov. (Pitkin, in press), have only recently been recognized. *M. gemella* was described from a unique male specimen from an alpine meadow at 1,950m in Austria (Rohacek, 1983), but in this study 20 specimens were taken between 91m and 625m. Similarly *M.* sp.nov. was represented by 18 specimens taken over the same altitude range. Thus there is no evidence that any species are restricted in their distribution to the uplands. In this respect they are similar to the Sepsidae (Randall *et al.* 1981), many species of which are also associated with dung.

The commonest sphaerocerid on upland peatlands is *Crumomyia nitida*. Previously, the main habitat recorded for this species was in lowland woods, and adults appeared in pastures during the winter. This species is one of several arthropods whose habitat embraces both moorland and woodland e.g. several spiders, carabid beetles and tipulid flies. It seems likely that the common environmental factor between these areas is the relatively high humidity produced by the leaf canopy in woods and the high rainfall in uplands. The much lower proportion of *C. nitida* on upland grasslands can be related to the better drainage and shorter vegetation on the grassland. There is, however, also the

possibility that competition is responsible for this difference in the distribution of *C. nitida*. White (1960a) showed that there was about six times the quantity of sheep dung deposited on upland grassland as on blanket bog areas. In this study the difference in the numbers of sphaerocerids captured on peat and grasslands was in the ratio of 1:2. On the grasslands there is much more competition for the available dung from earthworms (Svendsen 1957) and dung beetles of the genus *Aphodius* (White 1960b). Edge (1968) has shown that *Crumomyia nitida* has an appreciably longer development period than either *Lotophila atra* or *Copromyza similis*. Accordingly, it might be assumed that *C. nitida* is less able to withstand competition from related species, *Aphodius* and earthworms, and that its distribution is restricted to areas where the dung remains longer and allows completion of the life cycle.

Acknowledgements

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LITTLE GULLS IN YORKSHIRE

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Introduction

Over the last two decades, the Little Gull *Larus minutus* has shown a gradual increase in Yorkshire from being a scarce vagrant to a regular migrant, particularly in the autumn and this paper outlines the increase, culminating in the autumn of 1982 when a huge southerly passage was noted off the coastline. The influx was centred on the headlands of Filey and Flamborough, and the numbers involved totally eclipsed all previous counts of the species in British waters.

Breeding, Distribution and Movements in Western Europe

The majority of Little Gulls breed in eastern Siberia, though smaller numbers occur in western Siberia (between the Ob and the Ural) and on the southern and eastern shores of the Baltic (Fig. 1). Erard (1960) considered the species to be resident in the far eastern part of the range and it is probable that the birds recorded in the North Sea originate from the eastern European population. Evidence from limited ringing and observations suggests that birds in the western populations can use either a coastal route out of the Baltic and down the Dutch and French coasts, or alternately use an overland route following one of the major rivers, notably the Rhine and Danube and probably the Oder and Elbe. Increased seawatching during the last 20 years on both sides of the North Sea is

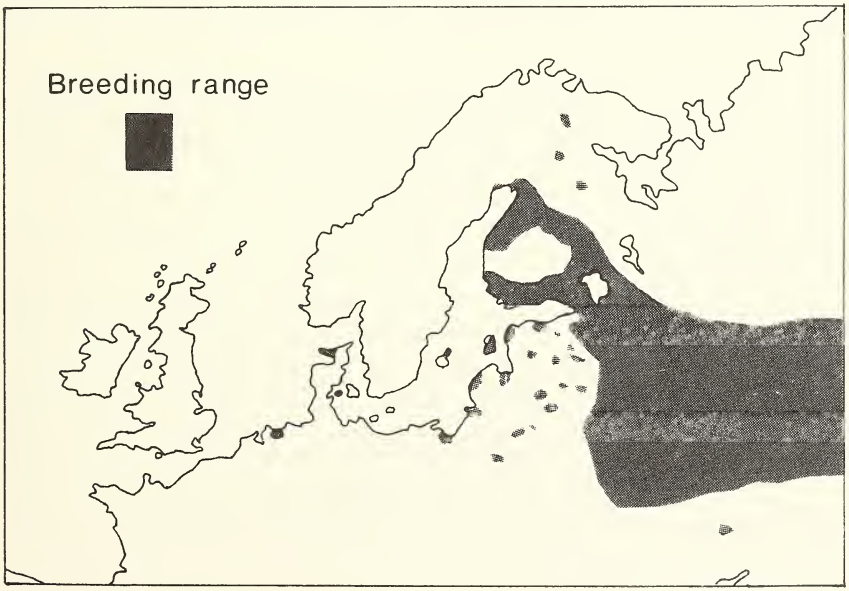

FIGURE 1
Breeding range of Little Gull in Europe

beginning to show a regular pattern of seasonal occurrences. Large numbers are recorded off the Dutch, Belgian and French coastlines every autumn, indicating that probably the bulk of the western population uses the coastal route at this time of year.

In spring the species is generally scarce in Britain though there is a growing trend for an increase in records. Passage on the continental coast of Europe can be high, though there is evidence that many use an overland route to the breeding quarters, with evidence of a build-up of birds in the Camargue. The high proportion of adults moving along the coast in spring (88% at Cap Gris Nez in April 1974) may suggest that immatures have a preference for overland routes. However the spring build up in the Camargue consists largely of adults (Cramp and Simmons) and occasional parties of thousands in northern Greece are mainly adults (A. M. Allport, *pers. comm.*). It is probable therefore, that the northerly movement of first-year birds is both later and more protracted.

The majority of Little Gulls in Britain are immatures, and certainly between the months of April and July, adults are in a minority at virtually all sites. It is of interest to note that most winter records refer to adults and this plumage predominates by as much as five to one at the areas where Little Gulls regularly occur e.g. eastern Scotland and south Lancashire.

Little Gulls first appear on the east coast of Britain in late July and early August, when the majority are juveniles. At the same time a build-up consisting mainly of adults occurs at the favoured east coast sites, notably Fife, Durham and parts of Yorkshire. These represent a small proportion of the European population, which remains in the vicinity of small lakes and reservoirs to complete their moult into winter plumage. The majority of the adults, however, remain in the Baltic to complete their moult. Adults become progressively more common at seawatch stations until late September and early October when they form the bulk of passing birds. Dispersal then occurs to winter quarters. Little is known of the wintering haunts but there is no doubt they are to some extent pelagic, ranging from Greenland to north-west Africa. Large numbers winter in the Mediterranean, Caspian and Black Seas and certainly the bulk of the population winters to the south of the British Isles.

Status in Yorkshire

The indications are that on occasions moderate or large parties of Little Gulls visited Yorkshire in the 19th century. 'Large numbers' were reported to be in the Bridlington area in February 1870. Up to 30 were noted at Redcar in 1905 but other than odd birds seen at that time the species was only brought to the attention of the YNU in eight of the years between 1912 and 1937; all these were single birds.

By 1950, individuals were being recorded annually. Increases in that decade showed 16 Little Gulls in the county in 1958, this leading to a statement in the YNU annual bird report for 1962 that the species was too numerous to detail each occurrence. By this time a pattern was emerging of odd wintering birds with indications of passage in August and September. Numbers were again 'too numerous' in 1967 and 21 were recorded at Hornsea on 28th August; a locality which was to be favoured in later years. In 1968, Spurn had 56 bird-days and at last the gull's 'rarity' status was beginning to be questioned.

The 1970s brought the real upsurge of records, starting in 1971 when both Filey and Hornsea topped the 50 mark in a day, but the peak count was at Spurn when 96 passed on 7th October and a continuing movement during that month reached a total of 727 birds (Cudworth 1971). 1972 showed similar widespread parties; Hornsea peaked at 32 on 3rd September but the highest count was at Kettleness, where in a period of moderate easterly winds, 29 flew south on 14th October followed by 86 the next day. This movement was not reflected elsewhere along our coastline. The early 1970s brought about a gradual increase, with flocks occurring at the then well watched Hornsea Mere, and further passage was noted at Spurn; daily numbers were often in the 30–50 region. 1976 was a remarkable year for seabirds generally; Hornsea recorded 55 Little Gulls on 20th September but the seawatchers at Flamborough noted the highest numbers with 85 on 25th September and 73 on 28th October. This later movement was reflected down the coast at Spurn where 135

passed the observatory in the period 27–29th. 1977 showed small increases at Hornsea with 87 on 21st September, but seawatching revealed nothing unusual, the maximum being 60 off Flamborough on 25th September.

1978 was another seabird year but numbers were not outstanding. Hornsea did at last top the hundred mark in a day when on 1st October 107 were counted; this was a day of tremendous sea passage following a north-easterly gale and Flamborough recorded 89 birds and Spurn 66. 1979 showed little change in the known status and it was not until August 1980, when Hornsea had exceptional numbers, that a definite annual increase was indicated. The build-up started in July, reaching a record peak of 170 on 22nd August and many of the birds commuted to the nearby sea front and possibly the same individuals were involved in the 113 seen earlier that month on the 13th.

In the following year, the Hornsea peak was not approached and the growing band of seawatchers did not detect anything unusual; the Flamborough maximum being 57 on 9th September and 20 were seen at Filey on the 5th.

Autumn of 1982

Migration started in July with a single bird at Filey on the 10th and two at Flamborough next day. Odd birds continued to be seen into August but on the whole the month was unremarkable. The weather was generally unfavourable for seabird movements and it was not until mid-month that numbers were noted off Flamborough with 29 on 16th, 32 on 21st and 50 on 13th September, numbers otherwise being relatively low.

It was on 24th September that the first sign of huge displacement was noted; the day started fine with a strong south–south-easterly air stream and the morning watch at Flamborough produced no sightings of Little Gulls but throughout the day the wind increased to gale force. At 1500 hours seawatching recommenced and by 1510 hours a line of birds was noted moving south at a range of one-and-a-half to two miles; the birds stretched as far to the north as the eye could see and they appeared to be feeding. During the following 90 minutes 724 birds were counted and at 1630 hours thick cloud came in off the sea and visibility worsened. Whether the Little Gulls stopped moving or simply could not be detected was not certain but in the following 30 minutes only two more birds were seen. At the peak time of the passage around 1540 hours, flocks of 149, 164 and 130 were noted but normally the parties consisted of small groups of less than 30 individuals.

On 25th September, seawatching commenced at Flamborough at 0630 hours. A moderate southerly wind was blowing (Fig. 2) and Little Gulls were present from dawn, but initially their movements were confused; 115 flew north in small flocks but by 0800 hours a southerly movement was under way and by 1100 hours the total flying in that direction had reached 475. Between this time and 1700 hours, a steady trickle occurred but suddenly numbers increased with flocks of up to 42 adding up to the day's total of over 1,000. Watchers at Filey, not alerted to this movement of Little Gulls, had the 'misfortune' to locate a Sabine's Gull *Larus sabini* in the bay and did not start seawatching until 0800 hours. A line of gulls was quickly located moving south about half a mile out to sea which were first thought to be Kittiwakes *Rissa tridactyla*. Suddenly, a darker bird appeared with them and after checking with telescopes this was identified as a Black Tern *Chlidonias niger* and the other birds as Little Gulls. A careful check showed that 79 birds were present in the flock of which 43 were adults or second-year and the remainder were first winter birds. Their behaviour was identical to the Flamborough birds, staying close to the sea and apparently feeding. Further small flocks were noted moving south until 1300 hours making a total of 201; the movement was then curtailed.

Clear conditions and a strong south–south-westerly wind prevailed on the morning of the 26th and during the period 0630 to 0830 hours watchers at Flamborough saw 113 birds flying south and 15 flying north. The passage appeared to stop after this time and further birds could not be located until 1700 hours when during the period to 1830 hours, 106 flew south including a flock of 34. On this date Filey recorded only a single bird, an adult.

Overcast skies and a moderate south–south-easterly wind on the 27th increasing later in the day, brought many birds offshore. Between 0645 and 1000 hours, 197 flew south off

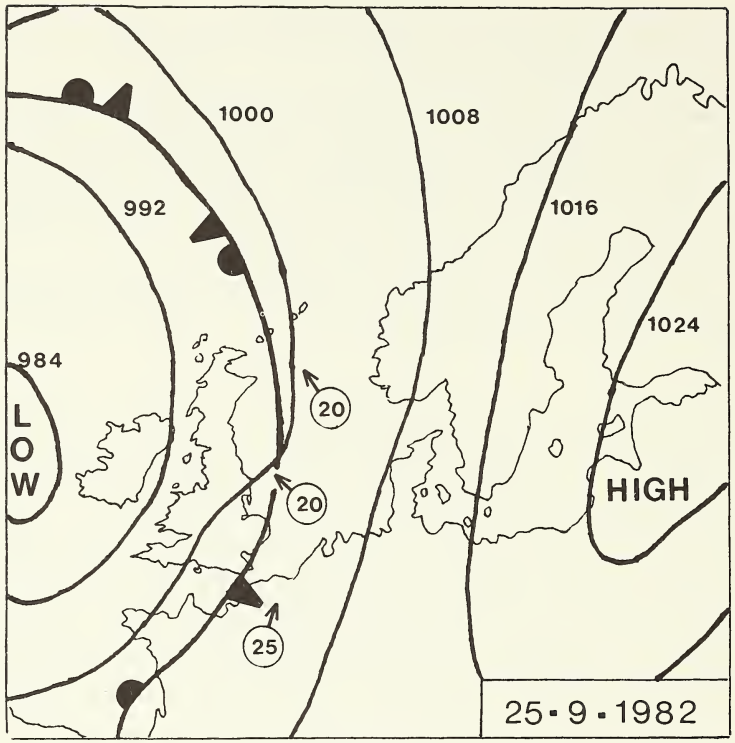

FIGURE 2
Weather map at noon 25 September 1982 showing high pressure system over central Europe and low pressure centred off Ireland giving strong south-easterly airflow over the North Sea

Flamborough and observers were pleased to note that the birds were passing closer than previously enabling more accurate assessments of their ages. During this period watchers at Filey noted 34 birds passing south but like Flamborough, passage was light during the late morning period when a front brought heavy rain to the coast. The rain cleared by mid-afternoon and almost immediately, a flock of 70 Little Gulls, which were unaged, was seen at Filey. This was followed by a much larger flock of about 200 which stretched from the end of the brigg across the bay, the majority of the birds having dark underwings and therefore adult. At 1530 hours good numbers were present off Flamborough and the passage steadily increased until by 1700 hours a continuous stream of birds was noted. A sample count with telescope showed 267 flying south in 18 minutes. The birds kept moving until dark and 44 were recorded in the half-hour until dusk at 1900 hours. The count for Flamborough on this day was 2072 birds.

The 28th September was sunny and bright with a strong southerly wind and 44 Little Gulls flew south in four hours at Filey but at Flamborough the position was confused; between 0635 and 0850 hours, 157 flew south but 185 moved north in moderate sized flocks, the bulk of the activity being in the first hour from dawn. The explanation for this northerly movement is probably the break-up of a roost; many birds were clearly present in the area and with large numbers at dusk the previous evening it is quite likely that many individuals spent the night on the sandy beaches of Bridlington and Fraisthorpe to the south. Passage continued until 1400 hours when 101 flew south in one-and-a-half hours

and a further 131, including a flock of 36, in the period to 1600 hours. There was little evidence of movement in the evening and no indication of numbers roosting in the area.

During a bright day with a flat calm sea on the 29th, no Little Gulls were recorded at Filey, but 21 flew north and 25 flew south at Flamborough between 0655 and 0815 hours and small numbers moved south between 1635 and 1735 hours but the signs were that the initial movement was drawing to a close after six days.

The last day of September and 1st October were days of clear skies and light south-westerly winds; Flamborough was unwatched during this period and only two birds were seen at Filey; both adults on the latter date.

South-easterly winds returned on 2nd October with a front bringing rain over the east coast and the North Sea by early afternoon. Only 12 birds were seen at Filey in the morning and 16 at Flamborough but by 1600 hours 355 flew south in quick succession at Filey as the effects of the rain brought birds close inshore. The torrential rain prevented the unprotected seawatchers at Flamborough from recommencing their observations until 1700 hours, and from this time until dusk, 491 flew south of which 310 were aged.

By the 3rd October, the wind had dropped and the skies had cleared and as a result, ten birds were seen at Filey in the morning and 69 at Flamborough. The 4th was a day of rain and poor visibility and few birds were seen at either headland. On the 5th October, the wind was again south-easterly and the morning started with torrential rain (Fig. 3); conditions were so bad that watching had to be abandoned at Flamborough with no Little Gulls being recorded. At Filey, however, after a dawn flock of 44 presumed post-roosting

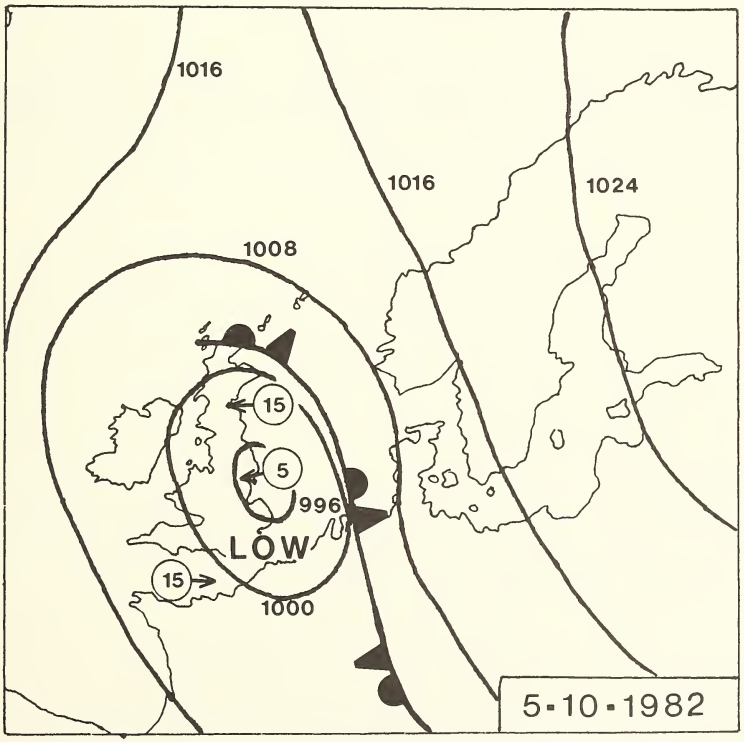

FIGURE 3
Weather map at noon 5 October 1982 showing low pressure centred over England with cold front moving eastwards bringing heavy rain to the western North Sea

birds, 253 were seen flying south between 0815 and 1200 hours and as conditions improved in the afternoon, 36 more were added in two-and-a-half hours.

During the following few days the wind went north then north-easterly producing a heavy fall of passerines. The sea, however, was not neglected and although watchers at both headlands failed to detect further large numbers, 18 flew north at Filey on 8th October with the last birds of the movement being on the 9th, when six flew north. The only movement of note at Flamborough during this period was 73 flying north between 1300 and 1400 hours on 7th October.

It is interesting to note that these large flocks of Little Gulls were centred on the headlands of Filey and Flamborough and other favoured seawatching areas to the north and south, i.e. Seaton Sluice, some Scottish coastal sites and north Norfolk, had a few, or no records, and only two of these sites logged anything significant. These were Whitburn, Co. Durham, where 69 flew south on 24th September, and Hartlepool, Cleveland, where 56 flew south in two-and-a-half hours on the morning of 25th September.

Elsewhere in Yorkshire, numbers of Little Gulls were probably lower than in recent years. Hornsea, for so long the centre of attraction for this species had a peak of only 62 in August and very few were noted in September and October. Withernsea on the Holderness coast did however have more than usual. It is possible that the birds moved in towards the sheltered flat coastline to feed and roost as most sightings were during the early morning. At this latter locality, numbers started on 22nd September when a total of 79 flew north in half-an-hour, and a further 96 next morning. Unfortunately there was no seawatch on 25th but next day, 131 in two groups were feeding offshore. Parties of 14 and 22 flew north on 1st October after which no other large numbers were seen although Little Gulls continued to be seen in small numbers at this locality well into November.

It was apparent that a combination of weather situations prevailed on the days with the greatest movements, and if there was any significant variation, records of Little Gulls decreased. Large numbers seemed to coincide with south-easterly winds and frontal systems moving east over the county bringing showers or longer periods of rain in to the North Sea. South-easterly winds without rain also produced Little Gulls, but in reduced numbers.

Little Gull Passage in the Eastern North Sea in 1982

As most of the Little Gulls seen in the North Sea are thought to originate from the Baltic, contact was made with Danish and Dutch observers to establish if passage along their coasts differed from previous years. Figures for 1982 received from Skagen, in Northern Denmark, where seabirds are noted passing through the Skagerrak from the Baltic, showed a 500% increase on the normal autumn passage of Little Gulls. Although the numbers involved were much less than those in Yorkshire there was an increase of similar proportions. The normal total for the autumn months is approximately 120 records, but in 1982, 614 birds passed Skagen between August and November. It is interesting to note that 89% of the birds were seen in September, the majority occurring during the first half of the month, which would coincide with the Yorkshire influx at the end of the month.

In the Netherlands, records were received from a number of seawatching positions, and all showed a decline in the numbers of Little Gulls during the autumn of 1982, compared with previous years (Hondsbossche in North Holland showed a 68% decrease in records during September and October of 1982, over previous years).

The numbers of Little Gulls on the Dutch coast in autumn usually involve several thousands (Woutersen 1980) and in good years the total has reached 10,774 (1976) and 8,625 (1977) with 1,114 flying south in one hour on 12th November 1977 at the Hook of Holland.

The picture for 1982 is not complete, but totals moving south in the autumn up to the end of October at Hondsbossche were only 291, and at Scheveningen, only 833; these are major seawatching points in the Netherlands.

A comparison of the 1982 records with previous years, suggests that the 6,000 Little Gulls noted along the Yorkshire Coast in 1982, would normally have passed along the

Dutch seaboard and were probably displaced by the strong south-easterly winds after leaving the mouth of the Baltic.

Ageing of Little Gulls

First-winter Little Gulls can easily be identified by the white underwing and the black W on the upperwing, running along the distal portion of the wing coverts and on to the primaries. The adults by comparison show a uniform pale grey upperwing and a uniform black underwing. These two distinct plumages enabled separation of the ages even at considerable distance with the aid of modern telescopes. By late September birds in their first summer i.e. a little over one year old, have generally moulted into second-winter plumage. These birds can be separated from adults but only with care and in ideal viewing conditions. Birds in this plumage superficially resemble full adults but careful examination of the upperwing usually reveals black tipping remaining to the outer primaries and the underwing, though dark, usually appears patchy, lacking the even black of the adults. Thorough examination of the nearer birds revealed the presence of a significant proportion of second-winter birds. It was decided that in view of the considerable distance at which many of the birds were noted, all second-winter birds should be included as adults.

Between 25th–29th September and again on 2nd October 758 birds were aged at Flamborough and in the period 25th–27th September 235 were aged at Filey (Table 1). Analysis of the results shows that 57.8% of birds were classed as adults. This percentage is

TABLE 1

Summary of Little Gulls aged at Flamborough and Filey in September and October 1982

Date	Locality	Sample size	Adult/ 2nd year	1st winter	% adult
25th Sept	Flamborough	260	136	124	52.3
25th Sept	Filey	201	114	87	56.7
27th Sept	Flamborough	157	96	61	61.2
27th Sept	Filey	34	16	18	47.1
29th Sept	Flamborough	31	19	12	61.3
2nd Oct	Flamborough	310	193	117	62.3
	TOTALS	993	574	419	57.8

significantly higher than in the case of Black-headed Gull *Larus ridibundus* 41.1%, and Common Gull *Larus canus* 40.8%. These results confirm the findings of Hutchinson and Neath (1978), indicating that Little Gulls exhibit a double migration, an initial movement to moult and a further movement to complete their winter dispersal. Evidence from ringing suggests that both Black-headed and Common Gulls do not show such a pronounced double passage and observations at Flamborough and Filey in September and October fully support this view.

Conclusions

Between 24th September and 7th October 1982, the largest numbers of Little Gulls ever recorded in British waters passed south off the headlands of Filey and Flamborough (Table 2). The majority of these birds were adults and this factor can be explained by the species undertaking a two-stage migration. The influx coincided with strong south-easterly winds, which are believed to have moved the birds from the mouth of the Baltic to the Yorkshire coast. Passage was particularly heavy immediately after low pressure systems had passed through, giving heavy rain. Information supplied by Dutch ornithologists

TABLE 2
Daily Totals of Little Gulls at Flamborough and Filey from 24 September to 9 October 1982

Date	Flamborough	Filey
September		
24th	726	—
25th	1047	201
26th	249	1
27th	2072	284
28th	583	44
29th	80	—
30th	—	—
October		
1st	—	2
2nd	512	399
3rd	69	10
4th	—	6
5th	—	333
6th	—	—
7th	73	—
8th	—	18
9th	2	6
TOTALS (16 days)	5413	1304

would indicate that the influx in Yorkshire consisted of birds that would normally have migrated down the eastern coast of the North Sea.

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OPTIMAL FORAGING BY BREEDING DIPPERS ON A LANCASHIRE HILL-STREAM

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Introduction

A study is currently in progress in the catchment of the River Wye, mid-Wales, into the diet, distribution and breeding success of Dippers (*Cinclus cinclus gularis*) in relation to prey availability. Ormerod *et al.* (1985) showed that the abundance of breeding Dippers in the catchment was strongly related to the abundance of some groups of benthic macroinvertebrates, notably larval Trichoptera. Additional dietary studies indicated that larval trichopterans were strongly selected by adult Dippers when foraging for their nestlings and consequently this order formed a major component of nestling-diet (Ormerod 1985). However, the latter study was based on small samples and it was unknown whether similar patterns occurred in other locations; quantitative data are scarce on the diet of breeding Dippers in the U.K. (e.g. Shaw 1979) and in Europe (e.g. Creutz 1966).

This paper describes the food, assessed by faecal analysis, of a pair of breeding Dippers and their first brood of four nestlings, reared in April 1984 on a tributary of the River Ribble in north-east Lancashire.

Study Area and Methods

The study nest was located at SD 806444 on a tributary (IB1) of Ing's Brook, which drains through an area of rough pasture and isolated stands of mixed deciduous woodland on soils underlain by the limestones and gritstones of the lower Carboniferous series. Falling for 4.75 km from its source at 400m O.D. to its confluence with Ing's Brook and Swanside Beck at 80m O.D., IB1 was composed predominantly of shallow riffle flowing over pebbles, cobbles and small boulders, and nowhere exceeding a width of 3m.

Macroinvertebrates were collected on 21 April 1984, within 50m of the nest, by a standardized kick-sampling technique (2 × 3 minute samples; net mesh aperture 400 μm) and relative abundances (numbers of individuals per sampling interval) for each macroinvertebrate order were determined in the laboratory. Concomitantly, fresh faecal pellets from adults and nestlings, the latter easily distinguishable by their membranous sac, were collected either in the vicinity of the nest or by direct handling of nestlings (under licence). At the time of sampling, the weights (49.0–61.0g) and development of the nestlings indicated an age of 17–19 days after hatching.

In the laboratory, each faecal pellet was processed by the method described by Ormerod (1985) which permits the identification and quantification of the remains of macroinvertebrate prey by counting mouthparts. Fish remains were more difficult to quantify and it was assumed that the presence of fish bones in any faecal pellet indicated that one fish had been ingested; this probably resulted in an overestimate since the remains of one fish were likely to be distributed over more than one pellet.

Prey weight contributions were estimated for each prey-type by multiplying the number of faecal occurrences by a mean dry weight, derived in most instances from ten individuals of each family from the field collections which were dried for 12h at 80°C and weighed on an autobalance (Table 1). For fish, only two individuals were available but both were Bullheads (*Cottus gobio*), each 4cm long which was the typical size and species of fish brought to the nest during several hours' observation. Similarly, only three limnephilid larvae were available for weighing.

Prey selection was assessed by Ivlev's index of electivity (Ivlev 1961, Ormerod 1985) which compared the relative proportions of prey-types in faeces and in field collections. The index ranges from −1, indicating avoidance or inaccessibility of prey items, to +1, indicating active selection.

TABLE 1

Mean dry weights for each type of prey item and their estimated percentage contributions by weight to the diets of adult and nestling Dippers

Taxon	*Mean dry wt. (mg ± 1 S.D.)*	*Contribution to diet %*	
		Adults	*Nestlings*
Ephemeroptera		*75.9*	*1.3*
a Baetidae	1.8 ± 1.1	44.9	0.4
b Ecdyonuridae	2.6 ± 1.9	31.0	0.9
Plecoptera		*3.4*	*2.2*
c Leuctridae/Nemouridae	0.9 ± 0.6	1.2	0.0
d Perlidae/Perlodidae	18.9 ± 14.9	2.2	2.2
Coleoptera		*0.1*	*0.0*
e Elminthidae	0.9 ± 0.2	0.1	0.0
Trichoptera		*16.2*	*62.5*
f Rhyacophilidae	11.1 ± 5.5	6.5	9.4
g Glossosomatidae	4.6 ± 1.9	3.8	8.3
h Hydropsychidae	2.1 ± 1.1	5.9	0.4
i Limnephilidae	30.0 ± 7.4	0.0	44.4
Diptera		*4.4*	*0.1*
j Chironomidae	0.7 ± 0.4	2.8	0.1
k Simuliidae	1.3 ± 0.6	1.6	0.0
Pisces		*0.0*	*33.9*
l Cottidae	145.2 N.A.	0.0	33.9

All mean weights derived from samples of ten individuals except *i*, for which only three individuals were collected and *l*, of which only two individuals were collected which were of a size (<5 cm) which made them appropriate prey-items.

Results

Eighteen and 20 faecal pellets containing the remains of 140 and 393 prey-items were collected respectively from nestlings and adults and there were marked differences between the two in the proportional representation of prey-taxa. The trichopteran families Glossosomatidae, Rhyacophilidae and Limnephilidae, and fish, comprised over 75% of the items in nestling faeces and the field collections indicated that these were taxa with mean dry weights (d.w.) > 4.0 mg. By contrast, adult faeces contained mostly smaller items (< 2.5 mg d.w.) from the Chironomidae, the ephemeropteran families Baetidae and Ecdyonuridae, and the trichopteran family Hydropsychidae (Fig. 1). The electivity indices also showed a strong relationship with prey-weight, with items < 1.3 mg d.w. negatively selected, items 1.3–4.0 mg d.w. selected by adults in self-feeding and items > 4.0 mg d.w. generally selected for nestlings (Fig. 2). Overall, adult faeces contained most prey-taxa in proportions similar to those in the field collections ($r = 0.581$ $p < 0.05$ after arcsine transformation) but the same was not true for nestlings ($r = 0.384$ N.S. after arcsine transformation) (Fig. 1).

When prey-weight contributions were considered, ephemeropteran nymphs comprised over 75% of the original dry weight of items in adult faeces whilst trichopteran larvae and fish respectively comprised 62.5 and 34% of the original dry weight of items in nestling faeces (Table 1).

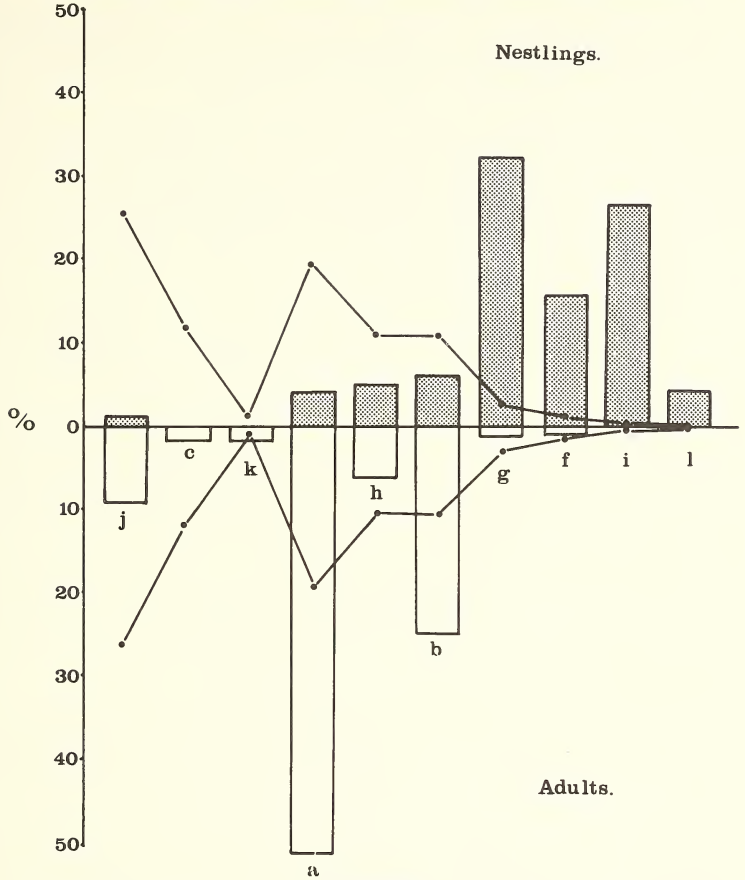

FIGURE 1

The percentage contribution by number of prey-taxa to nestling (stippled) and adult (clear) Dipper faeces. The superimposed kite-diagram represents the proportion of each prey-type in field collections and the letters refer to Table 1. The taxa are arranged in increasing order of mean dry weight and only those contributing > 1.0% of the items in adult or nestling faeces are shown.

Discussion

The validity of faecal analysis in assessing the food of breeding Dippers has been discussed elswhere (Ormerod 1985). Despite problems associated with the quantification of fish, there is evidence (Ormerod, unpubl.), at least for nestlings, that the components of ingested prey are faithfully reproduced by faecal analysis. Similar results have been described in other bird species (e.g. Davies 1977).

Although there was some variance between this study and Ormerod (1985) in the families involved, the results described here generally confirm other authors (Shaw 1979, Ormerod 1985) viz. that trichopteran larvae form a major component of the food of nestling Dippers. The size of some trichopteran larvae, relative to other macroinvertebrates, is apparently of particular importance in their selection by adult Dippers for

nestlings and, in addition, the larvae are relatively immobile and probably permit an effective capture and transfer of energy to the nest. This is despite a 'handling-time' which involves extracting larvae such as limnephilids from their cases (Jost 1972, described the extraction procedure). Such optimal 'central-place' foraging has been shown to occur in other bird species (e.g. Hegner 1982, Carlson 1983).

Other studies (Vollnhofer 1906, in Creutz 1966; Ormerod 1985) indicated that trichopteran larvae formed a larger component of adult food than that recorded here. However, in the Wye catchment (Ormerod 1985), trichopteran larvae became an increasingly important component of nestling food with increasing age and the clear difference recorded here between the foods of adult and 18 day nestlings is consistent with this trend; the low abundance of trichopteran larvae in the adult samples at this stage may represent a compensatory decrease.

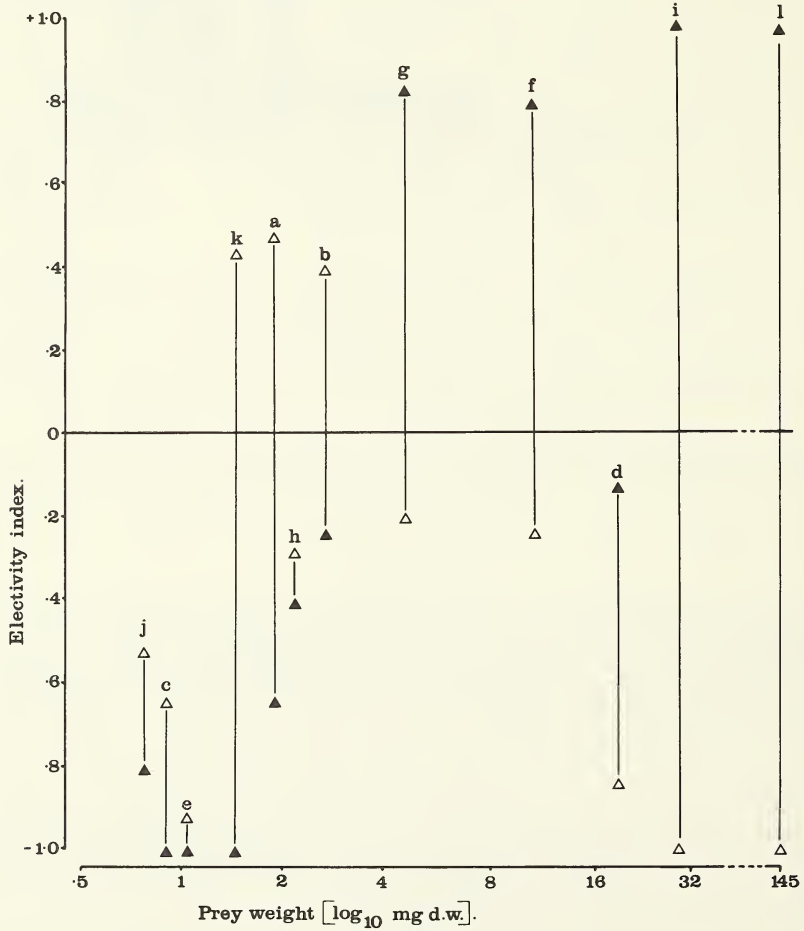

FIGURE 2

Relationships between Ivlev's Index of Electivity (Ivlev 1961) and prey weight. The points joined are the index scores for each taxa from adult (open symbols) and nestling (closed symbols) Dipper faeces. The letters refer to Table 1.

Acknowledgements
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NATURALISTS ON HATFIELD MOOR

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Introduction
East of Doncaster lies Hatfield Moor, *c.*1700 ha. of lowland raised mire and reclaimed mire, the latter now rich farmland, almost wholly in South Yorkshire. The site is roughly enclosed by the villages of Hatfield Woodhouse, Sandtoft and Wroot. It does not exceed an altitude of 6m. above sea-level, and is situated in an excessively flat region, once part of the much larger Level of Hatfield Chase. Sherwood Sandstones underlie Hatfield Moor, except where Mercia Mudstones occur in the extreme east. These rocks are succeeded by sand, silt, clay and peat, much of the latter having been commercially worked and removed for almost a century. The peat of Hatfield Moor is a Flandrian deposit, assigned to pollen zones VII(a) and VIII, described in detail by Smith (1958), and listed by Godwin (1975). The initiation of the Hatfield deposits was therefore contemporaneous with Mesolithic cultures, in surprising contrast to nearby Thorne Moors, where peat began to form relatively later, from the Bronze Age (upper VII(b) and VIII). In the centre of Hatfield Moor lies Lindholme, rising above the peat as an 'oasis in the desolate morass'; it is one of a number of small, discontinuous deposits of sand and gravel extending south-eastwards from near Selby, and seems to be morainic in origin.

The flora and fauna of Hatfield Moor first attracted comment in the early 18th century, with subsequent references in a range of sources. The earliest organized visit was probably that of the Goole Scientific Society in 1878, and in the following year the Yorkshire Naturalists' Union first held an excursion which encompassed Hatfield Moor. This paper summarizes the visits, and ensuing discoveries, of naturalists on the moorland up to 1960. In particular, early naturalists visited districts close to Hatfield Moor, or even visited the peat moor and surrounding region, compiling their results into one list; however, as far as possible, only peat moor work is included here. Hence works like Anon. (1884), Coombe and Stiles (1899) and Stiles (1900) are excluded.

Early References

The first antiquary to leave a detailed description of Lindholme, a site which attracted some early interest from writers, was Abraham de la Pryme, a descendant of immigrant Huguenots who had joined with Cornelius Vermuyden and his Dutch 'Participants' in draining Hatfield Chase. De la Pryme was born near Hatfield in 1671, and took Holy Orders in 1693, after which he achieved his first curacy, at Broughton in Lincolnshire. He subsequently obtained the livings at Hatfield in 1696, Hull in 1698 and Thorne in 1701, dying there of 'the new distemper, or fever' three years later. His antiquarian work included research on Hatfield, which was apparently commenced in 1696 (Jackson 1870), and was certainly under way in 1698. The British Library possesses de la Pryme's manuscript history *Historia Universalis Oppidi et Parochiae Hatfeldiae* (Lansdowne MSS. 897), which includes what seems to be the earliest specific description of Lindholme. He planned a more ambitious work on Hatfield, and his outline framework, given in his posthumously published diary (Jackson 1870) notes his intention to include in it, under the title 'Botanicus':

> 'an alphabetical enumeration, with short discriptions, of all ye trees, shrubs, hearbs, grasses, and flowers . . . that grows within ye bounds of this parish, with ye particular places where every one of them grows'.

This project, which would have included Hatfield Moor, was never published, and almost certainly never written. However, even the intention of doing so is significantly early; de la Pryme was aware of the pioneer work of Robert Plot in Oxfordshire and Staffordshire, and it is possible that he may have been influenced by it. De la Pryme did, however, contribute to the *Philosophical Transactions* of the Royal Society of London, including two communications (1701, 1702) on the trees formerly growing on Hatfield Chase, particularly from the evidence of their 'subterraneous' remains ('infinite Millions of the Roots and Bodies of Trees of all bignesses great and little'). Specific references to the moors are limited, the most interesting concerning *Pinus sylvestris*:

> 'there was a Tree of the very same Wood growing upon Hatfield More side within this 30 years, which a while after was cut down to make a Rail of, it being the very last of that kind that was flourishing here'.

De la Pryme's published work was subsequently used as source material by other early writers, including Rennie (1807/10) and Steele (1826).

George Stovin, a Crowle antiquary who died in 1780, wrote an account of Lindholme in the *Gentleman's Magazine* in 1747; it describes Lindholme from a visit made 20 years earlier, and includes the first substantial reference to the wildlife of the place:

> 'Here is great plenty of furze bushes, etc. and variety of game, such as hares, foxes, kites, eagles, curlews, ducks and geese; . . . the morass, which in some places is 4 miles cross, on which grows an odoriferous herb called gale, and a plant named silk or cotton grass, from its white tuff on the top resembling the finest cotton wool . . .'

A similar description is given by Stovin in what has become known as the 'Stovin Manuscript', now at the University of Nottingham Library. This unpublished history of the drainage of Hatfield Chase has two pagination sequences, the first of which ('A Brief account of the Drainage . . .', subsequently published in full by Jackson 1882) contains a short section on 'Hatfield waste' and 'Lindham'.

After these early visits, a number of 19th century topographical authors included the area in their scope; most were preoccupied with Lindholme rather than the peat moor, including Miller (1804), Peck (1813), Hunter (1828), Stonehouse (1839), Hatfield (1866) and Tomlinson (1882). Stonehouse crossed from Goodcop to Lindholme in the dry summer of 1836, his visit yielding the last known Yorkshire nest of Marsh Harrier until the modern successes documented by Grieve (1977) at Blacktoft Sands and Broomfleet Island.

Victorian Naturalists

Throughout the 19th century it seems likely that, as far as scientific study is concerned, Hatfield Moor suffered by being in close proximity, and superficially similar to, Thorne Moors, but was not known to have most of the latter's botanical rarities. This fact is exemplified by the entries in Davis and Lees' (1878) account of West Yorkshire. Hatfield Moor (usually then referred to, misleadingly, as Hatfield Chase) was mentioned in four lines:

> 'On the east lies Hatfield, with its ancient chase — where *Dicranum spurium* has occurred — a wide waste of moory ground, now for the most part drained, extending to the boundary of the county'.

Conversely, Thorne Moors was dealt with in four *pages*. Yet Hatfield Moor was not ignored: several early botanists have left details of their finds. Perhaps the first plant records for Hatfield Moor (after Stovin) are those of William Pilkington of Hatfield, who had already found several of the Moor's most interesting plants by 1816, including *Vaccinium oxycoccos*, *Andromeda polifolia* and *Rhynchospora alba* (Skidmore 1980). The Rev. J. K. Miller, a Walkeringham botanist who died in 1855, probably visited the Moor; his son T. E. Miller certainly did so, and noted *Frangula alnus* there. The Rev. Thomas Owston, a colleague of J. K. Miller, visited Lindholme and recorded *Andromeda polifolia* and *Epilobium angustifolium* (Miller 1895, Gibbons 1975). Other early botanists whose records were published (Lees 1888) include John Bohler, who claimed to have found the rare moss *Dicranum spurium* on 'Hatfield Chase', Amos Carr, who also located *Andromeda polifolia*, Samuel Appleby, who discovered *Osmunda regalis* 'on the borders of Hatfield Chase', and F. A. Lees, who wrote in 1887 that he had twice crossed the Moor, and had seen *Anagallis tenella*, perhaps on his visit in 1879. Dr H. H. Corbett, who came to Doncaster in 1888, had by the end of 1901, found 640 species of plants in the Doncaster district, some of these from Hatfield Moor.

The Dale Archives, at the Hope Library, University of Oxford, show that the noted entomologist J. C. Dale visited the Doncaster area in 1837, from 24th–31st July, and on 11th August. He visited Melton Wood, Hatfield Moor and Thorne Moors, and was apparently accompanied on these visits, *inter alia*, by F. O. Morris and Wm. Beckitt. His diary discloses that he was present 'Near Hatfield Chase or Moor' on 25th July. He recorded one species of beetle, 'Mordella humeralis' (*Mordellistena humeralis* Linn.), and two moths: 'Tinea parenthesella . . . (Morris had male and female Livonica [*sic*])', apparently references to *Sophronia semicostella* (Hub.) and *Hyles lineata livornica* Esp. respectively. The latter is recorded by Morris (1861) for 'Doncaster', presumably a reference to the foregoing somewhat inexplicable record.

C. W. Dale's manuscript catalogue of the Dale Collection notes several Hatfield Moor records, including two moths: 'R. Buoliana' (*Rhyacionia buoliana* D. & S.) with the details 'J. C. Dale Hatfield Chase July 28th 1837', though on this date, his diary records a visit to Thorne Moors; an error for 25th? 'S. Parenthesella' (*Sophronia semicostella*), presumably the same as the above, is noted in the catalogue, with the entry 'J C Dale Hatfield Moor July 25th 1837'. Under Hymenoptera, the catalogue notes 'Nomada borealis' (*Nomada leucophthalma* (Kirby)): 'J C Dale Hatfield Moor June 1827', an odd entry, not in his diary, and probably an error of date. In the same genus there is a reference to 'Nomada solidaginis' (*N. rufipes* Fab.), with the note 'E R Dale Hatfield Moor July 25th 1837'.

In 1879, F. A. Lees noted the moorland's most significant butterfly, *Coenonympha tullia* Mull., which was then the site's claim to entomological fame. The species was probably first noted there by J. R. Hawley, who described finding it on Thorne and Hatfield Moors, in a lecture to the Doncaster Philosophical Society in April 1866. However the species was also seen by Edwin Birchall, as recorded by Newman (n.d.) under the names 'Rothlieb's Marsh Ringlet' and 'Hadfield Fens'.

Thomas Allis, in his report on the birds of Yorkshire given to the British Association at York in 1844, quoted *verbatim* by Nelson (1907), noted three breeding species from

Hatfield Moor: Marsh Harrier, Ruff and Black-tailed Godwit. These details were probably based on records provided by the Doncaster taxidermist Hugh Reid, who died in 1863; the latter also provided records (including the two waders *antea*) for A. G. More's paper on the distribution of British nesting birds, published in *Ibis* in 1865. More wrote of the Black-tailed Godwit:

> 'The late Mr H. Reid, of Doncaster, has frequently told me that the Black-tailed Godwit used, within his recollection, to breed on Hatfield Moor, in which locality he once found the young birds himself'.

The details of the Godwit and Ruff were also noted by Morris (1866), Clarke and Roebuck (1881) and Nelson (1907).

Information on birds and other vertebrates was contributed to the Yorkshire Naturalists' Union circular for its excursion to Hatfield Moor in 1887 by T. J. Hasselby, A. I. Wells and Dr H. W. Arbuckle, the latter a Thorne doctor with a special interest in botany, who died *c.*1920.

Besides the visits of amateur naturalists and collectors, several organized visits were made to the moors in the 19th century. Perhaps the first of these was that of the Goole Scientific Society which, on 20th September 1878, included Hatfield Moor (they reached Lindholme) in a wide-ranging excursion to that region. The minutes of the society, and the published reports of the excursion (*Ann. Rep. Ctee. Goole Sci. Soc. 1878–79*: 8–10; *Naturalist* **4**: 61–62) record that the flora was found to be similar to that on Thorne Moors; the species logged included several bog plants — *Vaccinium oxycoccos, Andromeda polifolia, Myrica gale, Drosera rotundifolia* and *Rhynchospora alba*.

The Y.N.U. circular for the meeting at Doncaster on 4th August 1879 outlined the main botanical attractions of Hatfield Moor for those members who wished to visit the area. Another Y.N.U. meeting at Doncaster, on 14th May 1883, again gave an opportunity for naturalists to visit the peatlands. Spotted Flycatcher was recorded by Thomas Bunker 'on the borders of Hatfield Chase', and on the moor itself the liverwort *Marchantia polymorpha* was singled out for comment (*Naturalist* **8**: 173–176).

The seventieth Y.N.U. excursion was planned for Hatfield Moor on 21st September 1887. The excursion circular is a full and useful description of the moors at that time. The report on the visit (*Naturalist* **13**: 83–89) represents excursion reporting at its best — it is worth reading; extracts are quoted in a light-hearted article by Shaw (1971). The original account begins:

> 'Hatfield in the extreme south-west of the West Riding, was the spot selected, and the district marked out for investigation was that broad expanse of moorland nine miles square in extent, known as Hatfield Chase. The choice was a happy one, for not only was the hunting ground unlimited in extent, but practically the district had hitherto been unexplored'.

At the end of the day, reports on the work done were given by W. Eagle Clarke (Ornithology), W. D. Roebuck (Conchology and Entomology), P. F. Lee (Botany), H. T. Soppitt (Mycology), J. M. Kirk (Micro-zoology and Micro-botany), and several, including S. A. Adamson, on Geology.

The last known excursion of the 19th century involved the Hull Scientific and Field Naturalists' Club, who visited Hatfield Moors on 16th July 1898 (*Trans. Hull Sci. Fld Nat. Club* **1**: 24–28).

A further outcome of 19th century study of great value to naturalists was the publication of useful and detailed maps. One inch scale Ordnance Survey maps first appeared in 1821 and 1841, though perhaps the best map of the century was the six inches to one mile scale map of 1853. The geological features were also surveyed, and published (cartographically) from *c.*1859.

The Twentieth Century

Organized visits by natural history organizations in the present century mainly involve the Doncaster Scientific Society. A number of excursions were held in the Hatfield area, including Hatfield Moor, though it is not always clear if 'Hatfield' visits included the moorland, or that projected excursions to the latter took place at all. Hatfield Moor visits were announced for 2nd August 1897, 21st June 1906, 8th June 1908, 23rd July 1910, 5th June 1922, 3rd August 1925, 2nd August 1926, 17th September 1938 and 16th September 1939. The visits of 1906–10 are well documented in the society's minute books; although other visits are announced, the minutes record no details. A long report on the visit of 8th June 1908 appeared in the *Doncaster Gazette* of 12th June. The newspaper report (*Doncaster Gazette*, 29th July) of the 1910 visit to Lindholme was subtitled 'A Weird and Romantic Region'. At this meeting, the leader, W. Dawson, read a paper about the moors and Lindholme, quoted in the *Gazette* including a description of the site, peat-cutting, and characteristic vegetation, birds and reptiles.

The only Y.N.U. visit of the present century was held on 12th July 1952. The report of the visit (*Naturalist* **77**: 181–182) begins:

> 'Our visit soon found evidence that the moor was drier than in 1887, when the Union was last there. Many plants such as Bog Myrtle, Cross-leaved Heath, Purple Moor-grass, and Cotton Grass, were evidence of a wetter period, and what little water now remains will soon have gone through the activities of the British Moss Litter Company . . . Botany was well represented but the most interesting plants were not seen on the moor itself, which yielded nothing of moment. The general opinion expressed by all sections at the meeting later in the day was one of disappointment. Future visitors to the area are advised to keep to the outskirts of the moor'.

A contrast indeed with 1887! The sectional reports, given by W. A. Sledge (Flowering Plants), Mrs J. Appleyard (Bryology), F. C. Griffith (Ornithology), H. Whitehead (Freshwater Biology), C. A. Cheetham and A. C. Hoyle (Entomology) were brief; clearly there had been little of note, except that ornithologists today would not agree with Griffith's summary that it was 'altogether rather a poor day', as his list includes three pairs of Woodlarks.

Of the ornithological activity on and about Hatfield Moor in the present century, prior to the formation of the Doncaster and District Ornithological Society in 1955, the most significant early paper was one on the nesting of the Short-eared Owl 'in the low-lands in the south' of Yorkshire in 1924 (Armstrong and Phillips 1825); the site was actually near Hatfield Moor. Ralph Chislett first visited the region in 1906; his interest culminated in a Presidential Address to the Y.N.U. in 1939, published a year later in the *Naturalist*, entitled 'On the birds about a part of the southern county boundary of Yorkshire', being a survey of the levels between the River Idle and Hatfield Moor from 1929–39. During the same years, Chislett also communicated observations on the amphibians and reptiles of Hatfield Moor (Gallwey 1938, 1938a, 1939, Hazelwood 1940). In his county Avifauna Chislett (1952) included a number of references to Hatfield Moor, almost all of which seem to have been based on earlier references or his work during 1929–39.

Other ornithologists with an interest in Hatfield Moor included H. H. Corbett (Corbett 1915), Major G. W. Phillips (Limbert 1984), G. E. Hyde (Limbert 1984) and A. Hazelwood, who studied the area in the early 1930s (and possibly earlier), and included the records he gathered in a talk to D.S.S. on 22nd November 1933, entitled 'Some Uncommon Birds in the Doncaster District' (Livesey 1933). Annotations in a copy of the British Museum (Nat. Hist.) *List of British Vertebrates* (1935), now housed in Doncaster Museum, which are thought to have been made by Hazelwood, include an intriguing reference to a Common Wall Lizard at Lindholme, and several records from 'Hatfield', all seemingly referring to Hatfield Moor (Limbert 1984). A specimen of Pipistrelle held at Doncaster Museum was collected by Hazelwood at Lindholme on 9th September 1932.

The early reports (1951–60) of the D.D.O.S. contain a number of ornithological records

from Hatfield Moor and nearby Lindholme Lake. Records were submitted by a number of members, including J. S. Trimingham, R. J. Rhodes, J. Burley and A. E. Platt. J. and H. Lyon of Lindholme Hall provided unpublished records to Rhodes, who later (1967) incorporated them with other earlier records into Doncaster's first published Avifauna.

Naturalists with other interests also visited Hatfield Moor during the first sixty years of this century. Possibly one of the most regular was Wm. Bunting, who found, *inter alia*, Harvest Mice from the 1930s–50s (Bunting *et al.* 1969, Howes 1973), and *Viola persicifolia*, the Doncaster Museum herbarium containing a specimen of the latter, collected by Bunting, labelled 'Lindholme' and dated July 1964. Several botanists have made specific visits to the Hatfield Moor area, perhaps the most significant being S. P. Rowlands, W. A. Sledge and J. M. Taylor. Although Rowlands, a botanist of wide interests, visited Hatfield Moor at least as early as 1929 (*Naturalist* **55**: 92), published records of these workers seem to mainly cover the 1940s. In that decade, the reports of the Y.N.U's Botanical Records Committee (and *Naturalist* **66**: 203, 268) contain a number of their records from the Hatfield Moor region, though the work of greatest interest was that done on the genus *Potamogeton* in the area (Taylor 1943, Taylor & Sledge 1944). Some of Taylor's books, complete with his annotations, are held at Doncaster Museum; these pencilled records include some from the Hatfield Moor area. The moorland was also visited by the bryologist A. Thompson, who recorded a number of *Sphagna* (Thompson 1946).

Visiting invertebrates specialists during the present century seem to have been mostly concerned with Lepidoptera and Coleoptera, interest in other groups being seemingly restricted to a note by M. Yate Allen on rotifers (Allen 1926). Coleoptera records were obtained by G. Darley (Bayford 1903), H. H. Corbett (Thompson 1904, Balfour-Browne 1950, Bunting 1954), H. V. Corbett (Corbett 1906), E. G. Bayford (Stainforth 1944), P. Blasdale and W. Wilkinson, the latter two collecting water-beetles in October 1952 (Wilkinson and Blasdale 1953; Doncaster Museum Collection). Moorland Lepidoptera attracted the attention of H. H. Corbett (Beaumont 1981), S. M. Jackson, G. E. Hyde and L. G. F. Waddington. Collections made by the latter two, held at Doncaster Museum, both contain a good series of Hatfield *Coenonympha tullia*.

Acknowledgements

I wish to thank Mrs A. Z. Smith, Librarian at the Hope Department Library, University Museum, Oxford, for her helpful co-operation during my visits, and the Nature Conservancy Council who kindly assisted with travelling expenses to Oxford. Gratitude is also expressed to Doncaster Naturalists' Society for allowing their minute books to be examined for relevant details. A. Shaw facilitated initial access to the minute books of the old Goole Scientific Society. Clarification of some early records has been provided by H. E. Beaumont, M. E. Archer and P. Skidmore, and other help has been forthcoming from G. D. Gaunt and L. Smith.

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BOOK REVIEWS

Nest Building and Bird Behavior by **Nicholas E.** and **Elsie C. Collias**. Pp. 336; illustrated with line drawings and black-and-white photographs. Princeton University Press. 1984. Hardback £44.80, paperback £12.70.

As is fashionable nowadays, this book begins with a discussion of scientific method and the authors' conceptual approach to their subject, but after that they get down to the matter in hand. They offer a classification of birds' nest types, to which is added an appendix consisting of a list of the bird families of the world with an indication of the predominant type of nest adopted (no nest, cavity nest, open nest, domed nest) and additional facts such as the occurrence of brood parasitism and whether the nest (if any) is built by the male, the female or both sexes. A later chapter gives a classification of nest defences against predators, the main categories being concealment, camouflage, innaccessible siting, and taking advantage of other animals by nesting in association with formidable species or indulging in multiple or communal nesting. Within these frameworks the evolution of the nesting habit is discussed exhaustively. There are chapters on adaptations to the physical environment, internal factors in the control of nest building, the effects of parasites in nests, and much else besides. As the authors are authorities on the behaviour of weaver birds, naturally we learn a great deal about selection of nesting materials and how nests are built, illuminated by first-hand references to experimental results as well as a whole chapter on the analysis of weaver bird nest building. They do not neglect what might be regarded as side-issues either, and follow up such topics as bower building (structures quite separate and different from nests) in bower birds, in such a way as usefully to illuminate the main theme. There is some justice in the publisher's claim that the book is 'a much-needed synthesis of the previously scattered literature' and it should interest the general naturalist in an apparently mundane subject to which he has probably given little thought.

FHB

DIPTERA REPORT: 1977–84

P. SKIDMORE

A vast amount of recording has been done in Yorkshire since the last Annual Report (14), and this paper can only highlight a few of the more remarkable species which have subsequently been added to the county list. The long break in publication of Annual Reports has led to a regrettable breakdown in the once smooth flow of data to the Recorder, and this at a time of unprecedented growth in the study of Diptera. The apparent inactivity of the Recorder has meant that much collecting has taken place in the county without his knowledge, and indeed the fruits of many valuable researches have appeared in other journals. In this connection insofar as South Yorkshire is concerned the *Sorby Record* has replaced *The Naturalist* as the major source of data; hence a perusal of this journal is also vital in order to keep abreast of recording in Yorkshire. Nevertheless a huge amount of data has been passed to me.

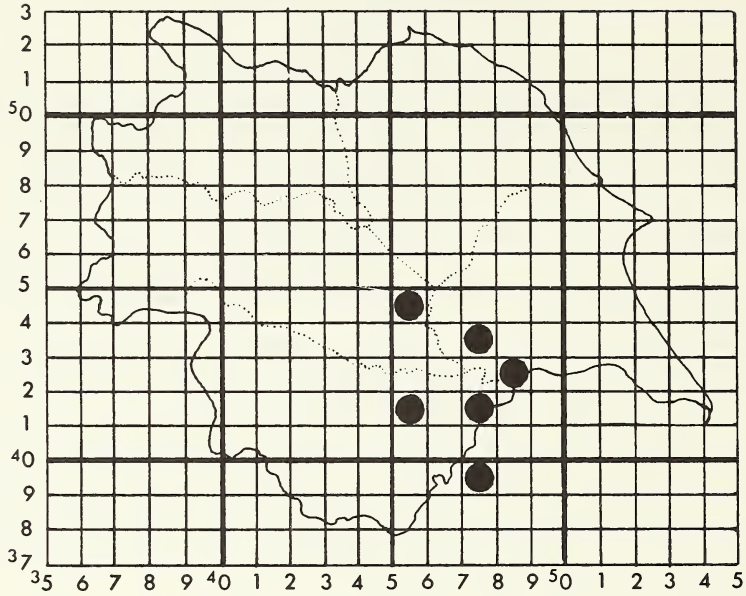
Nationally the study of Diptera is a major entomological growth area, largely thanks to the Diptera Recording Scheme organizers, although as yet this body's contributions from Yorkshire field meetings since 1978 have been disappointing: data has only been received from YNU members who participated. There has also been a growing number of dipterists passing through the county and sampling our riches before hastening on their way. All of their records form a vast untapped source of potentially invaluable data in a regional context, but how much will remain in closed notebooks under gathering layers of dust? Yorkshire dipterology would clearly benefit greatly by incorporating this data into the county archives, but much organization is essential before all these problems in data flow can be rectified; the Recorder appeals to all who have collected in Yorkshire, or who possess relevant unpublished data to contact him.

Current trends regionally and nationally have convinced the Recorder of the desirability of a publication on the 'Diptera of Yorkshire', in the form of an annotated checklist, and he is gathering and collating records on the new cards produced by Doug Richardson (Figure 1), with this objective in mind. The last *British Check List* (10) is now wholly out of date for many families and a Yorkshire list incorporating revised nomenclature and classification would be useful to students of British Diptera.

As stated above, this paper can mention only a few of the more unusual species added to the County List recently. Many of these are national rarities, including species classed as 'Grade 1 Red Data Book species' (17), whose presence in Yorkshire could never have been envisaged. Two of the most surprising are perhaps *Homalocephala albitarsis* and *Eurina lurida*. The former, known only from Speyside, is regarded as a Caledonian pine forest species, yet it turned up on a rotten beech trunk at Duncombe Park. *Eurina* has always been viewed as a rare prize of estuarine reedbeds in south-west England, but a specimen was found at Cherry Cobbs on the Humber shore out of sight of any reedbeds.

Publication of the superbly illustrated book on hoverflies by Stubbs and Falk (18) has led to a huge increase in interest in these engrossing insects. Indeed anyone seeking a wonderful lifetime study need ony purchase a copy of this excellent book and commence operations. In Yorkshire we are indebted to one such new convert, John D. Coldwell, who has carried out a very impressive survey of the hoverflies of the Barnsley area, following up the splendid work of Austin Brackenbury at Wharncliffe (3). The rather sudden appearance of a very distinctive group of hoverflies of Forestry Commission plantations is now well known and the more conspicuous members of this community, such as the magnificent *Eriozona syrphoides*, are being taken with increasing frequency in Yorkshire. These are assumed to be newcomers to our countryside, but another 'new' Yorkshire hoverfly, *Pocota personata*, has probably long graced our older woodlands. *Pocota* has always been regarded as a major prize by British dipterists lucky enough to visit Windsor Forest, or one of its very few other known sites in the older southern English forests. I recall many years ago seeing small numbers of these glorious flies around a rot hole in an old beech in Windsor Forest; an experience never to be forgotten! It was

Tipula (Nigrotipula) nigra Linnaeus, 1758



Tipula (Savtchenkia) subnodicornis Zetterstedt, 1838

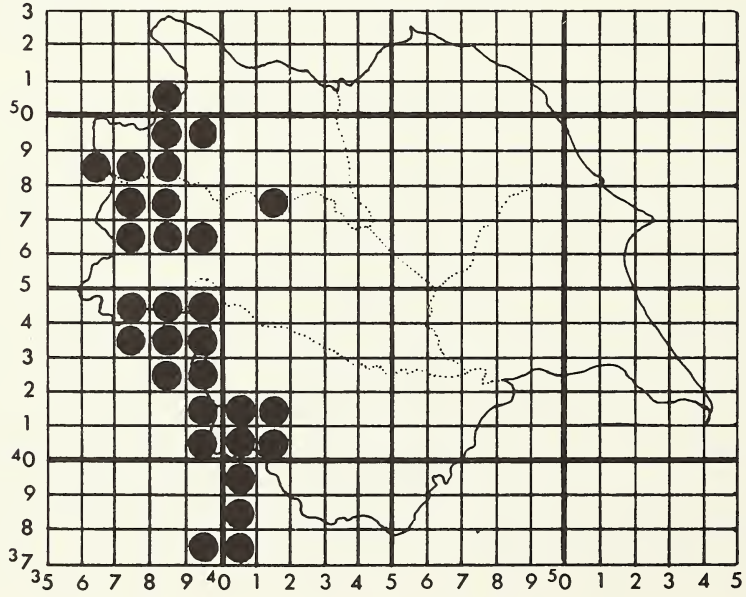


Figure 1. The regional distributions of *Tipula nigra* and *T. subnodicornis*

therefore with astonishment that I beheld a female *Pocota* at Duncombe Park on 18 June 1983. She was inspecting a large rot hole in one of the immense beech trees near the hall, about 5m from the ground, and remained there for fully ten minutes whilst I waited for her to descend and for my companion, Doug Richardson, to fetch his long-handled net. However, when I tried to catch her with the net, she flew away. In retrospect I feel that the capture of a gravid female of this rare and unmistakable insect would in any event have been unforgivable and unnecessary.

Another family of flies rendered relatively easy to identify in recent years is the Dolichopodidae, the subject of a masterly handbook by Assis-Fonseca (2). These often exquisitely beautiful flies have now become deservedly popular and some very uncommon species have been discovered in Yorkshire. In the last Annual Report the bizarre rarity *Campsicnemus magius* was added to the County List by Roy Crossley; evidently he has a special flair for spotting the weird and rare for he has now added *Campsicnemus (s.s.) compeditus* from the Austwick area. *C. compeditus* exemplifies a distributional type which has long perplexed northern English collectors, namely those species recorded from southern England and Scotland but not from the intervening area. In this report several species added to the county list exhibit this type of distribution (e.g. *Limonia omissinervis, Dioctria cothurnata, Mycetaulus bipunctatus, Themira germanica*).

It has been a fortunate quirk of fate that at a time when more dipterists than ever have been taking to the field, we have also experienced a series of very favourable seasons for our pursuits. Two superb flies whose presence in Yorkshire formerly bordered on the apocryphal, *Stratiomys singularior* and *potamida*, have enjoyed a succession of good seasons. In the Doncaster area these have been quite frequent, the former indeed numerous locally (15), but it remains to be seen whether their populations will be maintained.

With much talk of rarities, the purpose of recording can easily become focussed on these more exotic elements. However, it is equally important to continue recording the commoner species, and in this regard special thanks are due to Bill Ely for his prodigious work over the past few years. Whilst he has done as much as anyone in discovering rarities, he has excelled all past or present workers in noting the commoner species on his innumerable field trips all over the county. Indeed, time and again it can be shown that near-complete 10km × 10km distribution maps for many commoner species in Yorkshire are almost wholly due to Bill Ely's efforts.

The work of transcribing county records onto cards is progressing and some very interesting distribution patterns are developing. Two species of *Tipula* are shown in figure 1: *T. nigra* is regarded as a rare fenland species which in Yorkshire appears to be mainly a Humberhead insect, whilst *T. subnodicornis* could be expected to occur on any upland peat bog. Is the latter really absent from the North York Moors? It is one of the very few British craneflies in which the female is flightless, so dispersion across unfavourable terrain would prove a problem.

List of Species

Tipula (Lunatipula) livida Wulp (63) Anston Stones Wood, 8 viii 1979 (WAE). Scarce southern species.

Limonia (s.s.) masoni Edwards (63) Moses Seat, Lindrick, 20 v 1977 (JEA & PGS). Uncommon, Derbyshire southwards.

L. (s.s.) nigropunctata Schummel (63) The Terrace, Thurcroft, 22 v 1982 (WAE). Uncommon, Derbyshire southwards.

L. (Atypophthalmus) inusta (Mg.) (63) Rushy Moor Wood, 14 vii 1982 (PS).

L. (Dicranomyia) omissinervis (de Meijere) (63) Morley Pond, Wentworth Park, 8 vii 1982 (WAE). National rarity known only from Speyside and West Midlands.

L. (Dicranomyia) ventralis (Schummel) (63) Thorpe Marsh, x 1979 (PS).

Limnophila (Eloeophila) verralli (Bergroth) (62) Duncombe Park, on silty bank of river, 18 vi 1983 (PS).

Erioptera (s.s.) meijerei Edwards (63) Rushy Moor, open fen, 14 vii 1982 (PS).

E. (s.s.) nigripalpis Goetgh. (62) Ashberry Pastures NR., 8 vi 1980 (PS); (63) Old Park Spring Wood, Rotherham, 10 v 1977 (JCP).

Dixella attica Pandazis (63) Sandall Beat fen, in quantity on 10 vi 1981 (PS). A very rare, mainly estuarine species for which this is the only known inland site in Britain (Dr. R. H. Disney, pers. comm.).

D. serotina (Mg.) (63) Shirley Pool, 1 vii 1982 (PS). Very local fenland species.

Neopachygaster meromelaena (Dufour) (62) Duncombe Park, puparium under beech bark, vi 1980; (63) Hatfield Moor, many puparia with those of *Solva marginata* Mg. under sappy bark of dead poplar, v 1980 (PS). Oldroyd (11) only knew this fly from Hampshire and Herefordshire.

Chrysopilus erythrophthalmus (Loew) (65) A new British species taken in Swaledale by J. H. Cole (4).

Dioctria cothurnata Mg. (62) Thornton Bank, 27 vii 1980 (JHF). The only record for northern England (11, 13).

Psilocephala rustica (Panzer) (62) Duncombe Park, female swept from nettles by river, 4 vii 1981 (PS). A rare and very local species known from single sites in Berkshire, Herefordshire, Shropshire and Cheshire (11). I reared a male of this fly from a larva found in a shingle bank by the River Etherow in Cheshire in June 1962.

Platypalpus articulatus Macquart (63) Rushy Moor, open fen, 20 vii 1983 (PS). Rare southern fenland species.

Dolichopus arbustorum Stannius (63) Thornbury Hill 21 vii 1978 (MC, DWT, det J. H. Cole). Rare species known from Hereford southwards (2).

Hercostomus chrysozygus (Wd.) (63) Campsall Park, swept from lakeside fen, 23 vii 1977 (PS). Very local species, known from Norfolk southwards (2).

H. fulvicaudis (Haliday) (63) Blacktoft Sands, in quantities in water traps in reedbeds in June and July, 1978–1980 (AG). Only known from single sites, mainly on coasts, of Gloucestershire, Norfolk, Huntingdonshire and Cumberland (2).

Medetera nitida (Macquart) (62) Duncombe Park, on dead ash trunk, 4 vii 1981; (63) Hachell Wood, near Cantley, on oak trunk, 2 viii 1981 (PS). Uncommon species recorded from Cambridge southwards (2).

Achalcus melanotrichus Mik (63) Daws Plantation, Bentley, 16 vii 1980 (PS). Scarce species recorded from Huntingdon southwards, usually about rotting elms (2). Presumably this species has been spreading northwards with the Dutch Elm disease, like the stratiomyid fly *Pachygaster atra* (Pz.) which has now become widespread in Yorkshire.

Argyra atriceps Loew (62) Hag's Gill, Rievaulx, 23 vi 1979 (PS). Very local fly, recorded from Nottinghamshire southwards (2).

Campsicnemus (s.s.) compeditus Loew (64) Thieves Moss, vii 1984 (RC). Rare bogland species for which this is the first record for northern England (2).

Lonchoptera scutellata Stein (61) Hornsea Mere, in floating trap in reedbed, 8 vii 1979 (RH); (63) Rushy Moor, in *Caricetum* in open fen, 14 vii 1982 (PS). A very local and scarce fenland species (16).

Dasysyrphus friuliensis Dusak & Lastovka. Whiteley (21) discusses the Yorkshire status of this recent colonizer of Forestry Commission plantations.

Eriozona syrphoides (Fallen) Whiteley (20) notes the occurrence of this fine species at Wharncliffe Wood.

Parasyrphus malinellus (Collin) (63) Little Don, 15 vii 1984 (JDC); first noted in Yorkshire at Timble Ings (VC. 64) by R. Crossley in 1981. A conifer plantation species.

Neocnemodon pubescens Del. & P.-W. (63) Shirley Pool, 22 vi 1975 (PS). Very few British records, all from southern England (18).

Triglyphus primus Loew (63) Thrybergh riverside, 17 viii 1980, and Masborough, 30 vii 1982 (WAE). This appears to be spreading northwards and is associated with Mugwort (18).

Xylota florum (F.) (62) Forge Valley, 21 vii 1979 (WAE). This species is generally

replaced in Yorkshire by the northern and western *X. coeruleiventris* Zett.

Pocota personata (Harris) (62) Duncombe Park, female on 18 vi 1983 (see comments above) (PS). A grade 1 national rarity and Red Data Book species, this is an extremely local fly of old forest lands of southern England, but it was taken in southern Nottinghamshire many years ago (18).

Anasimyia contracta Claussen & Torp (63) Wilthorpe, 31 vii 1968 (RC); Thorne waterside, 14 viii 1982 (PS). Only recently separated from *transfuga* but evidently widespread (18).

Parhelophilus frutetorum (F.) (63) Clough Wood, Gunthwaite, a thriving colony in a damp glade, late vi 1984 (JDC). Recorded from Cheshire (12), and from Lincolnshire southwards (18).

Phagocarpus permundus (Harris) (63) Tickhill Castle, beaten from hawthorn by fishpond, 14 vii 1983 (PS). A southern species possibly spreading northwards.

Homalocephala albitarsis Zett. (62) Duncombe Park, teneral female on rotten beech trunk, vi 1980 (PS., teste B. Cogan). Another grade 1 national rarity and Red Data Book species, otherwise only known in Britain from Speyside.

Chamaemyia nigripalpis Collin (63) Pot Hill, Sandall Beat, NR., 12 vii 1983 (PS). Collin (6) only knew of this species from Cambridgeshire and Suffolk.

Themira germanica Duda (64) Malham Tarn, vii 1984 (WAE). Only otherwise known from Herefordshire and the Highlands.

Colobaea punctata (Lundbeck) (64) Otley, one ♂ by riverbank, amongst *Phalaris*, 18 viii 1984 (PS).

Opomyza punctella Fallen (63) Maltby Common, 4 ix 1982 (WAE).

Odinia boletina (Zett.) (63) One ♂, Hachell Wood, on oak trunk, 2 viii 1981, and one ♂two♀, but many seen, Kings Wood, Bawtry, on *Piptoporus betulinus*, 16 vii 1984 (PS).

Stenomicra cogani Irwin (63) Rushy Moor, open fen, one ♂ swept from *Caricetum*, 10 vii 1982 (PS). A very rare fly only known from rich fenland sites in Anglesey, Pembroke and Norfolk.

Braula coeca Nitzsch (63) Doncaster area, in about 10 per cent of hives in 1984 (pers. comm. J. Collins and P. Cunningham). The only previous county record was from the Scarborough area in 1953 (19).

Eribolus slesvicensis (Becker) (63) Bell's Pond, Thorne Moor, 17 vii 1982 (PS). Collin (5) records this from the coasts of Essex and Suffolk; in Yorkshire the similar *E. hungaricus* appears to be the commoner species of *Eribolus*.

Lioscinella atricornis (Zett.) (62) Ashberry Pastures, 15 vi 1980 (PS). Collin (5) only knew of this from Speyside.

L. fasciola (Mg.) (62) Ashberry Pastures, in marsh with previous species and *L. anthracina* Mg., 15 vi 1980 (PS). *Lioscinella* species appear to be very local in Yorkshire and the occurrence of three species together in one small marsh is quite exceptional. Collin (5) only knew of this species from Norfolk and Cambridge.

Elachiptera uniseta Collin (63) Rushy Moor, in open fen, 14 vii 1982 (PS).

Melanochaeta capreola (Haliday) (62) Hag's Gill, Rievaulx, 23 vi 1979 (PS); (63) Maltby Common, 29 v 1980 (WAE).

Meromyza coronoseta Hubicka (63) Bell's Pond, Thorne Moor, vii 1978 (ML) (15). Ismay (9) only knew of this species from Flatford Mill.

Eurina lurida Mg. (61) Cherry Cobbs, one ♂ amongst *Artemisia maritima* on Humber shore, 7 vi 1980 (PS). A very rare estuarine fly previously only known from south-west England.

Mycetaulus bipunctatus (Fallen) (63) Doncaster Museum, seven emerged from Goldfinch nest knocked out of horse chestnut tree in front of museum on 5 v 1982 (CAH).

Acanthocnema nigrimana (Zett.) (65) Cotherstone, one ♂ swept from vegetation on shingle at confluence of rivers Tees and Balder, 23 vi 1981 (PS). A very rare and little known fly of wooded valleys of north and west Britain.

Mydaea maculiventris (Zett.) (65) Cotherstone, one ♂ in dense herbage by *Polyporus*

squamosus on fallen tree, under closed canopy by River Balder, 23 vi 1981 (PS). Rare species known from Cambridge southwards (1).

Limnospila albifrons (Zett.) (61) Spurn, 19 ix 1971 (PS); (63) Bell's Pond, Thorne Moor, vii 1978 (ML). No other known record from northern England (1).

Coenosia flavicauda Ringdahl (62) Forge Valley, 21 vii 1979 (PS). A scarce species (1).

Phaonia falleni Michelsen (63) Old Canals, Thorne Moor, 18 vi 1984 (PS). Uncommon species but widespread (1).

Acknowledgements

I would like to thank all who have submitted records to me over the past years. They could have been excused for feeling that such action was futile since no reports have been forthcoming. However, I can assure all that their records have been entered onto the Yorkshire Diptera Card Index and are of great value in building up a picture of the dipterous fauna of the county and country. Thanks are offered to Miss J. E. Addy, J. D. Coldwell, J. Collins, Mrs. M. Crittenden, R. Crossley, P. Cunningham, W. A. Ely, J. H. Flint, A. Grieve, R. Hawley, C. A. Howes, M. Limbert, I. F. G. McLean, Miss P. G. Stenton and D. W. Twigg for the records published in this report. Finally I acknowledge a special debt of gratitude to Lord Faversham and his agent, Mr. I. N. Saggers, for kindly allowing access to Duncombe Park, which is probably the richest site in northern England for insects associated with old forest land.

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100TH AUTUMN FUNGUS FORAY
York, 7th–14th September 1983

T. F. HERING

To celebrate the 100th birthday of the Mycological Section, we invited the British Mycological Society to join us at York University. The central event was an address by our Chairman, Dr R. Watling, on the history of Yorkshire mycology. In seven days of collecting, we found that 1983 was not an outstanding season for larger fungi, as some of the normally common species were scarce or unrecorded. Nevertheless the total list of finds was a long one, owing to the number (80) and expertise of those participating. A full list appeared in the *Bulletin* of the B.M.S. in October 1984, and the purpose of this report is to list the 71 new Yorkshire records (including five new to Britain), and many others for which the county had few records. We are grateful to the B.M.S. members for making a considerable number of additions to the county flora, and I am indebted to Dr R. Watling and Dr B. Ing for help in compiling this list.

A = Allerthorpe Common, SE/755480
B = Bramham Park, SE/424404
C = Strensall Common, SE/653618
D = Dalby, SE/875875
E = Bishop Wood, SE/554333
F = Forge Valley, SE/984873
* = new to Yorkshire
H = Castle Howard, SE/715702
K = Kirkham Priory, SE/735659
M = Buttercrambe Moor, SE/723573
N = Nun Appleton, SE/556401
S = Skipwith Common, SE/667368
W = Cloughton Wood, TA/001955
** = new to Britain

MYXOMYCETES

Clastoderma debaryanum F*
Colloderma oculatum F
Cribraria persoonii B, K
C. rufa F, K
Echinostelium colliculosum N
E. minutum E, F, N
Licea operculata F
L. pusilla F
Paradiacheopsis fimbriata B, C, E, H, M
P. solitaria C, F, N*
Pocheina rosea E, F, H, M, N
P. solitaria C, F, N*
Protosteliopsis fimicola C*
Physarum oblatum F*

ASCOMYCETES

Discomycetes

Acrospermum pallidulum C
Arachnopeziza eriobasis H
Arachnoscypha aranea N
Ascobolus crenatulus S
Belonium hystrix C, S*
Bisporella pallescens C*
Callorina carneo-flavida N*
Calycellina leucella C*
C. punctiformis M
C. spiraeae M

Coccomyces dentatus B
Cyathicula subhyalina K
Dasyscyphus bicolor B
D. ciliaris C
D. dumorum K
D. fuscescens H
D. tenuissimus M*
Hyalopeziza ciliata B*
Hyaloscypha paludosa S*
Hymenoscyphus albidus B, K
H. epiphyllus H
H. salicellus B
Leptopodia stevensii M
Micropeziza poae C*
Microscypha grisella S
Mollisia caricina H
M. humidicola H*
M. minutella H
M. palustris H
Naemacyclus minor K*
Niptera melatephra C*
Ombrophila ambigua H*
Orbilia curvatispora B
O. cyathea B, K*
O. leucostigma B, H, M
O. sarraziniana B
Peziza echinospora H*
P. emileia B
P. limnaea B
P. micropus B
Pezizella chionea S
Ploettnera exigua B
Pseudohelotium alaunae H*
Psilachnum inquilinum H
Rutstroemia petiolorum M
R. sydowiana C, K, M, S
Scutellinia hirta K
Scutoscypha fagi B, M*
Tarzetta catinus B
T. cupularis K
T. gaillardiana M*
Trichophaea woolhopeia B
Trochila craterium K, N
T. laurocerasi B
Tuber aestivum H
Unguicularia cirrhata B

Other Ascomycetes
Chaetosphaerella phaeostroma B, K, W
Cymadothea trifolii B
Epichloe typhina H
Lasiosphaeria canescens B
Leptospora rubella S
Microthyrium ciliatum H & var. *hederae* K*
M. ilicinum H*
M. macrosporum H*
M. pinophyllum N
Nectria peziza B, N
Rosellinia mammiformis B
Stomiopeltis cupressicola N
Tympanopsis euomphalia H, B

BASIDIOMYCETES
Rust and Smut Fungi
Melampsora hypericorum on *Hypericum androsaemum* N
Puccinia caricina on *Carex pendula* F; on *C. riparia* H
P. circaeae on *Circaea lutetiana* H
P. crepidicola on *Crepis vesicaria* W
P. deschampsiae on *Deschampsia caespitosa* F
Ustilago succisae on *Succisa pratensis* B, H

Heterobasidiomycetes
Calocera glossoides K, M
Exidia plana H
E. thuretiana B
Tremiscus helvelloides C

Aphyllophorales
Caldesiella ferruginosa M
Cristella candidissima K, M
C. farinacea K
Cyphellopsis anomala B
Fibuloporia wynnei B, M
Ganoderma resinaceum K*
Grifola frondosa B
Heteroporus biennis B
Hyphoderma tenue K
Hyphodontia detritica H*
Hypochnicium punctulatum B
Lachnella villosa M

Peniophora limitata K
P. lycii B
P. nuda B
P. rufomarginata H*
Phellinus contiguus K
P. pomaceus H
Polyporus badius M
P. ciliatus H*
Resinicium bicolor B
Rigidoporus vitreus N
Serpula mollusca K
Stereum rameale B*
Tomentella pallido-fulva B
Tremiscus helvelloides D
Typhula sclerotioides B
Tyromyces subcaesius K*

Agaricales

Agaricus bohusii N*
Baeospora myosura A
Bolbitius titubans H
Boletus albidus B
B. impolitus N
B. pulverulentus H
B. queletii H*
B. spadiceus H
Collybia succinea W*
Conocybe mesospora B*
C. semiglobata K*
C. siennophylla B*
C. siliginea M
Coprinus callinus M*
C. leiocephalus H, M
C. picaceus B
C. urticicola H
Cortinarius armillatus C
C. helvelloides H
C. lilacinopusillus H*
C. pulchellus K
C. uliginosus C, S
Dermoloma cuneifolium N
Entoloma sphagneti C, S**
E. turbidum C, S*
Gomphidius roseus S
Gymnopilus fulgens S*
Hebeloma sacchariolens B
Hohenbuehlia geogenia W
Hygrophoropsis fuscosquamula K*
Hygrophorus cossus B
H. insipidus B
H. langei C
Inocybe brunneo-atra E
I. cookei B
I. descissa B
I. dulcamara B
I. jurana B
I. lacera S
I. lanuginella H
I. maculata B, H
Laccaria tortilis H, S
Lactarius acerrimus B, N
L. britannicus K
L. decipiens H
L. deterrimus C*
L. fulvissimus H*
L. lilacinus K
L. obscuratus var. *radiatus* H
L. pubescens S
L. spinosulus K*
Leccinum holopus C, S
L. melaneum C*
L. oxydabile H*
L. roseofracta C
L. variicolor C, S
Lentinellus cochleatus F & var. *inolens* M
Lepiota acutesquamosa B
L. bucknallii K
L. eriophora K
L. fulvella K
Leptonia corvina B
L. cyanula C**
L. incana B
L. turci B*
Lyophyllum decastes N
L. immundum B
Marasmius calopus B, K
M. epiphyllus S
M. graminum H, S
Melanotus horizontalis B*
Mycena dissimulabilis S
M. erubescens S
M. gracilis N
M. rubromarginata K
Naucoria sumptuosa H*
Nolanea icterina M
N. tenuipes K
Oudemansiella mucida N
Panaeolus ater H
P. campanulatus K
Panus torulosus K
Paxillus atrotomentosus W
Phaeomarasmius erinaceus S
Pholiota abstrusa K
P. myosotis S
Pluteus atromarginatus B, W
P. boudieri H
P. griseoluridus K (provisional name for new species)

P. murinus B, H*
P. patricius F, W
P. pellitus M
P. petasatus B
P. pseudoroberti M**
P. thomsonii B, H
Psilocybe rhombispora K
Resupinatus applicatus B
R. rhacodium B*
Russula caerulea B
R. chloroides H*
R. grisea M
R. ionochlora H
R. lepida H
R. medullata N**
R. parazurea H
R. pulchella C, S
R. pumila K
R. queletii B
R. sanguinea S
R. sororia B, N
R. versicolor C, K
Tricholoma carneum N
Tubaria autochthona K
T. conspersa K
Uloporus lividus H*
Volvariella murinella N
V. parvula B, N

Gasteromycetes
Bovista plumbea K
Cyathus striatus M, N
Geastrum sessile M
Scleroderma areolatum H*
Stephanospora caroticolor F*
Vascellum pratense C

FUNGI IMPERFECTI
Anavirga laxa H
Beltrania querna H*
Candelabrum spinulosum H
Ceuthospora phacidioides H
Codinaea simplex H*
Dinemasporium strigosum H*
Endophragmia elliptica M
Endophragmiella taxi H*
Leptothyrium ilicinum H*
Microdiscula phragmitis C*
Periconia digitata H
Phaeostalagmus tenuissimus H*
Polythrincium trifolii H
Pyrenochaeta ilicis H
Ramularia didymia H*
Stachybotrys dichroa H*
Subulispora britannica H*
S. minima H*
Triposporium elegans H

HORNSEA MERE DECOY

None of the standard sources on Yorkshire duck decoys mentions one at Hornsea Mere. However, the name Decoy Bay is still in use at the Mere, and is obviously a name of some antiquity. A plan of the Mere dated 1778 (see *Naturalist* **38**: 89) labels a bay 'Decoy', though no details are shown.

K. C. Bramley (*Bull. Hull Nat. Hist. Soc.* **3**(4): 17–26) comments:

> 'I am almost certain there was a decoy at Hornsea Mere, for there is still a Decoy Plantation and Decoy Bay close to Wassand Hall at the south-west end of the Mere. Sir Marmaduke Strickland-Constable (in litt.) has searched on several occasions but never found any documented record. In view of the lack of any information, its existence will probably remain a matter of conjecture'.

It is very unlikely that a true 'pipe' decoy was constructed next to Hornsea Mere. The proximity of so much water would have rendered it unviable. Almost certainly, the feature involved was a net-lined bay of the Mere, into which flightless ducks were driven, and taken in quantity, at the end of the breeding season. The exact date of the 'decoy' is still unresolved.

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A FERVOUR FOR FUNGI

W. A. SLEDGE

Yorkshire has great mycological traditions. James Bolton's three volume *History of Fungusses growing about Halifax* published in 1788–91 was one of the first illustrated accounts wholly devoted to the fungi to be written in the English language. A century later the Yorkshire Naturalists' Union had come into existence and already it had a strong mycological branch which was holding annual forays in different parts of Yorkshire. It was at a meeting of the Mycological Section of the Y.N.U. that, Minerva-like, the British Mycological Society sprang into being.

The accumulated mycological records were published in 1905 as *The Fungus Flora of Yorkshire*. This was edited by George Massee and Charles Crossland and was issued as volume 4 of the Botanical Transactions of the Yorkshire Naturalists' Union. Thirty-two years later Mason and Grainger's *Catalogue of Yorkshire Fungi* appeared. In this a greatly increased number of species were listed but without details other than a tabulated register of vice-counties in which each species had been recorded.

These publications served as an impetus to further study and the Mycological Section continued its field work with unabated zest. A notable feature of the history of the Section is that at no time have its activities ever languished temporarily for want of leadership or the stimulation provided by the presence at forays of mycologists of national standing, some of them drawn to our meetings from far beyond the confines of the county. The names of C. Crossland, G. Massee, A. E. Peck, T. Petch, F. A. Mason, E. W. Mason, A. A. Pearson and W. G. Graddon spring to mind as outstanding figures at past forays. The present generation is equally fortunate in having the active support of some of the country's most distinguished mycological systematists.

The publication of a new *Fungus Flora of Yorkshire** is another landmark in the history of the Mycological Section of the Union. Everyone who has participated in forays in Yorkshire will especially welcome the association of this work with the name of Willis Bramley, for no one in the annals of Yorkshire mycology has hunted more assiduously, more persistently or more successfully than he. In his preface to this work he recalls having attended his first foray at Castle Howard in 1921 where 'I was introduced by F. A. Mason to the fungi'. Never was seed planted in more receptive or more fertile ground!

From then onwards Willis has been diligently combing the woods and fields of Yorkshire for fungi; indeed his mycological activities span half the lifetime of the Union itself. For forty years his name has regularly appeared in *The Naturalist* as compiler of the section's foray reports. Innumerable gatherings of his have been sent to Kew or the Commonwealth Mycological Institute for identification and systematic papers in the *Transactions of the British Mycological Society* dealing with British fungi, and more particularly with Ascomycetes and Hyphomycetes, are liberally sprinkled with citations of Willis Bramley's collections.

As custodian of the Section's records, Willis Bramley has industriously assembled all records from forays, from his own private collecting and from information gleaned from literature sources. The 'ten or a dozen notebooks' which contained this accumulated data have been the basis on which the present Flora was built. The task of assembling this information in proper systematic order, of making the necessary nomenclatural and taxonomic changes required for the incorporation of early records and the provision of supplementary information bearing on places visited on forays, publications cited and records concerned, has been a formidable undertaking. The task has been shared by experts in different groups — Roy Watling, Mike Richardson, Tom Preece, Tom Hering

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* *A Fungus Flora of Yorkshire 1985* by *W. G. Bramley*. Pp. xii + 277. Published by the Mycological Section of the Yorkshire Naturalists' Union, and obtainable from Dr T. F. Preece, Agricultural Sciences Building, Leeds University. Price £9.00 or, by post, £10.00.

and others — so that, although Willis Bramley's name appears as author, he would be the first to acknowledge that this book has been a cooperative undertaking, with Tom and Shirley Preece shouldering the overall responsibility of preparing the whole text for publication.

I estimate that roughly 3700 species are covered; the arrangement within the major groups is alphabetical for both genera and species, and authorities for names are omitted in all those groups for which standard taxonomic treatments are available. A series of appendices covers all the localities visited on Y.N.U. forays from 1881–1984, *Naturalist* references to all foray reports, a key to collectors' names cited by initials in the text and a general bibliography. The daunting task of proof-reading such a mass of information has been triumphantly surmounted by the editors and the Leeds University Printing Service has produced a volume the handsome appearance of which does justice to the editorial care which has been given to its preparation. How appropriate too that a splendid photograph of Willis Bramley has been included as a frontispiece.

Autumnal displays of toadstools vary greatly from year to year. More so than most other organisms the fleshy fungi tend to be unpredictable in their appearance; but if the expected fails to reveal itself it is likely that the unexpected will be found. It is this discovery of the unexpected which adds a spicy element of adventure to autumn forays. All those who turn the pages of this Flora and who have attended past Y.N.U. mycological excursions will have memories brought back of forays when notable species were seen by them for the first — and often the only — time. It brings back to me the thrill of finding *Strobilomyces* at Grantley, of *Clavaria juncea* in Saw Woods and that rare, diminutive and remarkable agaric *Collybia racemosa* at Clapham. But it also brings back memories of past mycologists such as Dr. Charlie La Touche whose enthusiasm and insatiable appetite for forays and fungus-hunting prompted the priest who officiated at his requiem service to say in the course of his address 'I hope there are lots of fungi in Heaven'. It will, we trust, be many years yet before Willis Bramley turns his attention to the celestial rust fungi and pyrenomycetes, but if foliage and timber exist in paradise then it is impossible to believe that they will not in the fullness of time be subjected to the closest scrutiny by him!

It is written into our constitution that the object and aims of the Union are to promote the scientific investigation of the fauna and flora of the county. This is a responsibility as well as a pleasurable occupation for those concerned. The responsibility lies in making the facts accumulated by one generation of workers readily available to their successors and this is best achieved by the publication of Floras and Faunas. A file or register in the hands of a sectional secretary or recorder, however complete and detailed, is of small value compared with a volume of printed and published records which can be bought, consulted and cherished by all interested workers. The labour involved and the costs incurred in producing such works are heavy but their importance to the next generation of workers is great. They serve as stepping stones in the advance of our knowledge. The publication of this book therefore is a notable event for the Union as well as for the Mycological Section, for it vindicates our *raison d'être* and shows that despite the formidable expenses of production, a section which has clearly defined targets for its activities and the drive to do it can still produce the kind of work on which in the past the prestige and high reputation of the Y.N.U. were built. Our congratulations and thanks therefore go to Willis Bramley and all those members of the Mycological Section who have had a hand in the production of this book.

BOOK REVIEWS

The Encyclopaedia of Mammals : 2 edited by **David Macdonald**. Pp. xxxii + 446, including numerous photographs and line drawings. George Allen & Unwin, London. 1984. £25.00.

This comprehensive work deals, in two volumes, with all groups of mammals. In this, the second volume, are included elephants, ungulates, rodents, lagomorphs, bats, marsupials and some smaller groups. The editor has obtained the assistance of leading authorities to provided the accounts of the ecology, adaptations and general biology of species or groups of species with the book structured around the standard taxonomic groupings. A check list of the species covered in this volume is included, together with their main geographical ranges.

This is a quite exceptional work in its approach, coverage and quality of presentation. It is written in a style to attract both general and specialist readers, with a liveliness of presentation and an exceptionally outstanding quality of illustration. The very large number and range of colour photographs and line drawings in both colour and monochrome are a great asset and useful complement to the text. It is an enormous task to attempt to deal with all groups of mammals in two volumes, particularly as our knowledge about them grows daily. There are difficulties of coverage to be given to groups such as bats and rodents having large numbers of species compared to the better-known ungulates and elephants with fewer species. The editor has done an excellent job in providing a careful balance, with the obscure and little-known invariably being given a fair share of the content. This is an invaluable and up-to-date reference work, and while £50 for the two volumes is quite a costly investment, it nevertheless represents good value. Certainly no public, university, college or school library should be without this book.

MJD

A Last Wild Place by **Mike Tomkies**. Pp. vi + 250, with 62 colour plates. Jonathan Cape, London. 1984. £9.95.

Mike Tomkies took up residence in a deserted property on a remote Scottish loch that could only be approached by a seven-mile boat journey from a landing with access to essential facilities. Here he lived for several years, accompanied only by his Alsatian, in order to write on the flora and fauna in which he was so immersed. He traces the seasonal changes on the loch, in the woodlands and in the surrounding hills. His writing has considerable style and a richness of expression. This, coupled with his excellent knowledge of natural history and his great sensitivity to the reactions of animals to their environments, makes his account quite absorbing. To the naturalist interested in the birds, squirrels and deer, but above all the seasonal changes of the West Highlands, this book is a worthwhile acquisition. Together with his personal experiences, hardships and rewards, it makes for a fascinating read.

MJD

Human Evolution by **Roger Lewin**. Pp. 104; many two-colour illustrations and photographs. Blackwell Scientific Publications. 1984. £6.80.

This book aims to give an up-to-date introduction (the author claims 'a broad up-to-the-minute overview') to present knowledge of human evolution, and thus inevitably it will soon seem old-fashioned. Meanwhile we have some thirty essays illustrated with photographs and two-colour Scientific-Americanish drawings (a few of them actually come from the *Scientific American*) expounding simply (sometimes deceptively so) the views of the experts of the year before last; surely up-to-date enough for anyone. A particularly interesting contribution tabulates the changes in scientific attitudes to human evolution from 1850 to the present day, and shows how these influenced ideas and theories at the time, so that for instance in the 1920s Piltdown Man (an obvious enough fraud) was accepted whereas Dart's *Australopithecus* (equally

obviously an early hominid) was discounted. Other essays explain continental drift, restate Darwin's hypotheses clearly and firmly, and expound modern evolutionary ideas ('creationism' is not dignified with the title of 'idea'). Then there are concise accounts neatly summarizing the known facts about hominid precursors, Australopithecines, *Homo habilis*, *H. erectus* and Neanderthal and modern Man. These contributions will probably stand the test of time, but some essays coming later in the book on human culture, art and language may prove more ephemeral. This is an easy-to-read and useful book.

FHB

Ecology 2000 edited by Sir Edmund Hillary. Pp. 252, many illustrations. Michael Joseph. 1984. £10.95.

This book is about the relationship of man with nature on a global scale. It provides up to date facts and analysis on population growth, desertification, pollution, extinction, agriculture and so on. The eight contributors are mostly professional authors and journalists so the book is very readable and well illustrated but the breadth of coverage attempted means that an irritatingly superficial, rather selective picture is presented. The terms pot boiler, band waggon and coffee table cannot be avoided, though 'A' level geography students might find it a useful source of facts with which to leaven essays.

OLG

Catalogue of the Natural History Drawings Commissioned by Joseph Banks on the *Endeavour* Voyage 1768–1771. Part I: Botany: Australia by **Judith A. Diment, Christopher J. Humphries, Linda Newington** and **Elaine Shaughnessy**. Pp. 183 including 6 b/w plates, plus 8 colour plates. Bulletin of the British Museum (Natural History), Historical Series Volume 11 (Complete). 1984. £30.00 paperback.

The main part of this work consists of a list of this very important collection of botanical illustrations, providing detailed information on specimens, manuscripts, outline and finished drawings, and copper plates of more than 400 species. It is preceded by a succinct but highly informative introduction including biographical information and is supported by a most useful bibliography. The whole is well indexed, with separate lists of plant names (with synonyms), place names, and artists and engravers. At such a high cost, it is a pity that such a reference work has an untitled spine, thus making it anonymous on the book-shelf.

MRDS

British and Irish Herbaria, compiled by **D. H. Kent** and **D. E. Allen**. Pp. iv + 333. Botanical Society of the British Isles, London. 1984. £12.00 paperback.

An eagerly awaited revision of Kent's most useful 1958 index to plant collections. This second edition covers institutional, and to a lesser extent private, herbaria, providing such details as names of collectors, dates and areas covered, and occasionally the extent of the material. Although the main emphasis is on extant collections, there is frequent mention of untraced material — surely a stimulus to botanists to undertake a little detective work!

This work is as comprehensive as is currently feasible: a wholly definitive guide is inevitably unattainable. We must indeed be grateful to the compilers for dedicating themselves to the immense task of collating such a wealth of information. It is important that botanists should compile and supply further information for future publication as and when it comes to their notice; in the meantime, it does not behove them to nit-pick over relatively minor omissions and errors as often happens in the case of such reference works.

MRDS

Plant Facts and Fancies by **Sylvia Woods**. Pp. 93, illustrated with black and white drawings by Yvonne Skargon. Faber and Faber. 1985. £5.50.

This book, aimed at the younger reader, explores in a simple and direct manner some of the plant lore which has come down to us through the centuries. In eight chapters devoted to medicinal plants, flowers in history, floral customs, tree lore, etc. Sylvia Woods has included many interesting anecdotes, myths, facts and legends. Indexed.

JOHN CORDEAUX ORNITHOLOGIST

Brian S. Pashby

An appreciation of the great Lincolnshire naturalist of the 19th century, an ornithologist of international repute and a pioneer in the study of bird migration. For almost fifty years he lived close to the lower Humber shore and was a frequent visitor to Spurn, where he established the first organized recording system for the peninsula. Included are facsimiles of his notes and extracts of letters from his friend Gätke.

Foreword by Bob Spencer. 90 pp. £4.50 plus 30p P.&P. from the Spurn Bird Observatory, Kilnsea, Patrington, Hull HU12 0UG.

COMMONWEALTH AGRICULTURAL BUREAUX

Produced by the COMMONWEALTH MYCOLOGICAL INSTITUTE

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